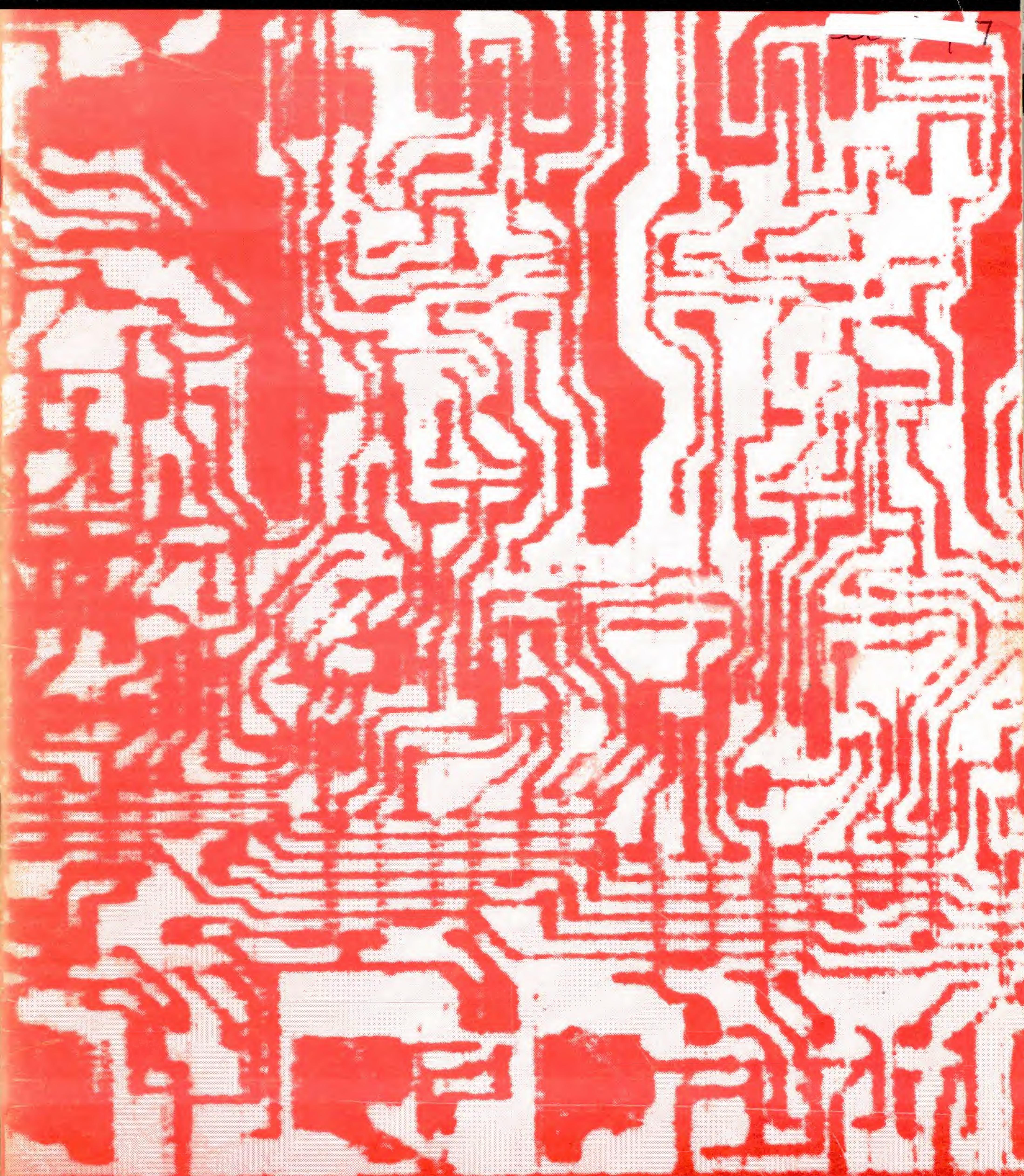


**TRS-80 SYSTEM 80 VIDEO GENIE**



**MICRO-80**

P.O. BOX 213, GOODWOOD, S.A., 5034, AUSTRALIA. TELEPHONE (08) 272 0966. PRICE: AUS. \$2.50, NZ. 3.00, U.K. £1.50

\*\*\*\*\* ABOUT MICRO-80 \*\*\*\*\*

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MICRO-80 is an international magazine devoted entirely to the Tandy TRS-80 microcomputer and the Dick Smith System 80/Video Genie. It is available at the following prices (all prices shown in Aus.\$ except for U.K. prices which are in pounds Sterling).

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The purpose of MICRO-80 is to publish software and other information to help you get the most from your TRS-80, System 80 or Video Genie and their peripherals. MICRO-80 is in no way connected with either the Tandy or Dick Smith organisations.

\*\* WE WILL PAY YOU TO PUBLISH YOUR PROGRAMS \*\*

Most of the information we publish is provided by our readers, to whom we pay royalties. An application form containing full details of how you can use your TRS-80 or System 80 to earn some extra income is included in every issue.

\*\* CONTENT \*\*

Each month we publish at least one applications program in Level I BASIC, one in Level II BASIC and one in DISK BASIC (or disk compatible Level II). We also publish Utility programs in Level II BASIC and Machine Language. At least every second issue has an article on hardware modifications or a constructional article for a useful peripheral. In addition, we run articles on programming techniques both in Assembly Language and BASIC and we print letters to the Editor and new product reviews.

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EVERY NEW AUSTRALASIAN SUBSCRIBER TO MICRO-80 WILL RECEIVE A FREE CASSETTE CONTAINING THREE LEVEL I AND THREE LEVEL II PROGRAMS PLUS COMPREHENSIVE DOCUMENTATION.....THE RETAIL VALUE OF THE SOFTWARE WOULD EXCEED THE COST OF THE SUBSCRIPTION!!!

## \*\*\*\*\* EDITORIAL \*\*\*\*\*

## \*\*\* TANDY MODEL III IN AUSTRALIA \*\*\*

Rumours abound concerning the arrival of the Tandy Model III into Australia. Officially, Tandy expects to release the Model III in May. Also officially, the Model I will continue. Unofficially, the Model III could well be released earlier, although that will be subject to shipping delays etc. Also unofficially, we believe that, shortly after the release of the Model III, the Model I will be dropped completely from Tandy Australia's range.

The price for the Model III has not yet been announced by Tandy. Our information is that the Level I/4K machine will sell for \$100 more than the Model I Level I/4K; ie. \$799. The 32K dual disk drive version is likely to sell in the \$2600-\$2800 range. Whilst these prices are still above those in the USA (LI/4K is US \$649), they are closer than previously and are another indication that Tandy is changing its pricing policy for the better.

What about software compatibility? News coming out of the USA indicates some potential problems here. Firstly, Model I machine language programs which make use of ROM calls are almost certainly going to be useless on the Model III. There are even indications that some BASIC programs may present problems. Devices such as the Exatron Stringy Floppy will also need some substantial redesign since the 2K gap in the memory map which is used for the operating system just does not exist in the Model III which has a 14K BASIC interpreter rather than 12K as in the Model I. MICRO-80 has a model III on order in the USA (on back order actually!) and we are eagerly awaiting its arrival. Naturally, we shall inform all our readers of its capabilities and characteristics at the earliest opportunity.

## \*\*\* SYSTEM 80 DEVELOPMENTS \*\*\*

Nor is the Dick Smith organisation being ignored by the rumour-mill although we are less certain of the reliability of our information in this case. One story is that there will soon be a super SYSTEM 80 all in one piece a la the Tandy Model III. Another part to this rumour suggests that this machine will have an Exatron Stringy Floppy installed as standard. Still other rumours suggest a colour model. In terms of hard facts, the Dick Smith organisation has sold over 2000 SYSTEM 80's since their introduction in May 1980. That is an average of about 300 units per month which, we guess, could be a little disappointing to D. S. E.

Tandy is very secretive about its level of sales but it is difficult to believe that it could be less than D. S. E.'s. Our guess, and it is a guess, is that Tandy is selling 500-600 Model I units per month. Anyway, whatever the true figures, it is clear that microcomputing in Australia is growing rapidly although not as explosively as it has in the USA and the UK.

## \*\*\* MICRO-80's NEW PREMISES \*\*\*

MICRO-80 is bursting at the seams, as any of our Adelaide readers who have visited us could attest. We have therefore decided to move the whole operation into our new premises at 433 Morphett Street, Adelaide where we originally intended to locate just the MICRO-80 Computing Centre. As you can imagine, this is a fairly major operation and has been consuming a considerable amount of our time over the past few weeks. The effect has been to delay the publication of this issue and many of our readers who have telephoned have found that the telephone answering machine is in operation for much of the time. We hope you will continue to be patient for a little longer until we get the extra space and staff we need, when we will be able to have the 'phone manned by a human during normal business hours and your Editor will be able to spend much more of his time actually editing the magazine. One effect of the move will be a change in our phone number during business hours. As soon as we have the new number manned, we will announce it on the telephone answering machine. So, if you are in the habit of hanging up the moment you realise that there is an answering machine on the line, perhaps you had better hold on a little longer to hear the number to call.

In the meantime, we are happy to announce the appointment of Fred Miller as Sales Manager. Fred has had considerable experience in servicing customers in a number of different industries and is very familiar with the TRS 80/SYSTEM 80. Fred will take responsibility for the MICRO-80 Computing Centre and also the MICRO-80 PRODUCTS mail order business. We are sure that Fred will quickly become a part of our team and will improve the standard of service to our customers even further.

## \*\*\* THIS MONTH'S MAGAZINE \*\*\*

There has been a great deal of interest in the machine language programs we have published in past issues. So this month, we have published two ml. programs, both well documented and commented. A well-commented assembly language source listing takes a lot of space so one or two other features have had to be held over to make room. These include Disk Drives - Questions and Answers (Part 3) and Input/Output. These will return next month and, of course, we are also expecting the next instalment of GT BASIC for that issue.

## REVIEW OF ESCON SELECTRIC CONVERSION by David Grigg

Ever since I bought my TRS-80, one of the main uses I have had in mind for it was as a word processor. In my spare time, I am a fiction writer and as I am also carrying out a correspondence course at university level, I end up doing an awful lot of typing. I've had a typewriter since I was 12 years old, so by now I ought to be able to type fairly well. But like all typists, I make a lot of mistakes. And every time I made a mistake when I was typing a clean final copy of a story or an essay, I would have to stop, use white-out fluid, wait for it to dry, type over the mistake and only then carry on typing again. This slowed me down enormously. So the idea of a word processor certainly appealed to me.

I have owned an IBM Selectric typewriter for about five years and found it an excellent machine. So when I bought the TRS-80, and found out that there was a way to hook up the computer to the IBM, I was very pleased. There was only one problem and that was the cost. I had to wait for a year before I could save enough for the conversion (after all, I had just gone out and spent \$1000 on the TRS-80!).

In August last year, however, I finally had enough.

The Escron conversion to the Selectric is marketed by ASP Microcomputers, of East Malvern, Victoria. The complete conversion kit, including solenoid assembly, manuals and Universal Interface, cost (last I heard) \$729. If you want ASP to install the solenoids in your typewriter, it will cost you an extra \$100. Now, here's the first point. That extra \$100 is well worth it. I attempted to install the solenoids myself, much to my later regret.

The advertising for the conversion says that it takes about 4 hours to install the solenoids and adjust them. I think that's 4 hours for their own expert, who installs two conversions a day. Five evenings after I first opened up the IBM and started unscrewing, attaching, hooking and soldering, I had the typewriter printing alright. Printing garbage! The thought of any further work, especially delicate adjustment, was beyond me. I sent the typewriter to ASP and let them finish off the adjustment.

It was probably a good thing that I did because my slightly aging IBM decided that it didn't like all this fiddling around with it and developed a fault of its own, unrelated to the solenoid additions but I think, related to the movement and joggling that it had been getting. An IBM service call fixed that (a point very much worth noting is that IBM will honour their service agreements on ESCON converted typewriters). But if that problem had occurred while I was working on the machine, I probably wouldn't have figured out what was going wrong.

Certainly, I spent rather more than \$100 worth of frustration and anxiety in trying to install the solenoids myself. But then, I am not a very handy person, nor are my mechanical skills very good. If you are used to disassembling motorbikes, clocks or typewriters, you may well save yourself something by doing the conversion yourself.

How well does it work now the solenoids have been installed? Well, there's now a little black box between my cassette port and my cassette deck, with a switch on it which has to be selected between TAPE and PRINT. And between that box and the typewriter, there's a large blue box, with lots of electronics in it (including a 6502 microprocessor). That sounds like a lot of hardware but it doesn't take up much room on the desk and it works beautifully. Given a tiny software driver, I can LPRINT or LLIST immediately. And given the excellent TASP program marketed by ASP for the Exatron Stringy Floppy (there are disk and cassette versions, too), word processing is a snap.

The TASP wp program, written by Peter Darling, is really an excellent piece of work. I haven't had any experience with Tandy's SCRIPSIT but I have with Electric Pencil and as far as I'm concerned, TASP beats Pencil easily, and it's cheaper, too! TASP enables you to enter formatting commands along with text so that, for example in an essay, you can set all quotes in indented margins with very little effort. Justified margins, if you want them, of course; hyphenation or not, as you will; page headings and automatic page numbering, again optional; pro-forma letters with changing inserts; you name it, TASP has it. Indeed, the main problem is becoming familiar enough with the manual. Text is entered straightforwardly, with a destructive backspace key. One feature TASP omits deliberately is that annoying Pencil habit of cutting off letters when you are typing fast at the end of a line: the screen is just considered to wrap around, which doesn't take much getting used to.

TASP also has an excellent editing feature, which allows you to insert, delete, re-order lines, search for particular letters, just about everything Pencil has and possibly more. These functions are based on an extended set of the normal Microsoft editing commands for BASIC text (TASP text is stored automatically as BASIC program lines). A delight to use.

And the whole system, together? Well, this review has been written and edited using TASP and printed out using the ESCON conversion to my IBM. I wouldn't write any other way.

I'm not certain of this, but I'm fairly sure that TASP would work equally well with other printers than the ESCON converted Selectric. Price is about \$75. (David is right about the price - TASP is available from MICRO-80 PRODUCTS - Ed.)

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#### ESCON - PLUS SCRIPSIT - A FEW COMMENTS by David D. Harris

With a small business having a typing requirement which is ideal for word processing, I set about finding the cheapest, reliable way of achieving it. After some research I purchased a TRS-80 (Model 1) using Tandy's scripsit W/P program. As a printer I use an IBM Selectric typewriter which I already owned, converted with an Escon interface unit.

In general, I am very happy with this set-up. Scripsit is very versatile, easy to use and bug-free and deserves all of the praise it currently seems to be getting.

The Escon interface? Ah, thereby hangs a tale!

I bought the interface from Computer Marketing, the S.A. agent for ASP Microcomputers. I elected to install it myself. I am only moderately handy but succeeded in having it running after about a day of work. The instructions are quite explicit and, although adjustment is rather critical, it is not difficult.

It is a little frightening having to delve into the bowels of the typewriter to install the driving solenoids but it is very instructive in showing how the IBM typewriter works. This knowledge has come in handy since!

As an overall operating system my experience is that the Escon/Selectric set-up has some plusses and some minuses.

On the plus side -

The Selectric is a very good and highly developed typewriter. It has available a wide range of type faces and has a full IBM service back-up which is unaffected by the installation of the Escon interface.

The Selectric can be used as a typewriter when standing alone and also when connected to the computer - even when the computer is outputting to it so long as printing is halted at the time. This is very handy for underlining, correcting minor mistakes etc.

On the minus side:-

I feel that the reliability of the electro-mechanical part of the interface (the solenoids and linkage) is marginal for routine use in an office. I have had two links break, as well as occasional problems with, for example, links touching sound absorbing pads within the typewriter. This is not too bad if someone handy is around to replace a link (about a half hour job when you've done the first one), or otherwise trouble-shoot the occasional problem.

Another irritation, applicable to any typewriter conversion and certainly not a fault of Escon, is that printing is very slow. The first time you operate the printer, its 15 characters per second seems fast. When you get used to it and you realise that it takes around 4 minutes to print a page you long for something with dot-matrix printer speed and typewriter quality. Unfortunately, ain't no such animal.

I have added two features to the system which make it more appropriate to an office environment -

A heavy-duty plug in the data cable. This allows the typewriter to be easily and frequently unplugged from the computer and moved around the office, which is necessary for stand-by use as a pure typewriter. Incidentally, NEVER unplug it while the computer is switched on unless you enjoy replacing burnt-out diodes!

An IBM sound absorbing kit. Without this it is just too noisy for an office. Somehow it seems noisier as a printer than as a pure typewriter, or maybe it's just the fact that its operation is continuous.

When used with Scripsit the Escon system has a whole further range of idiosyncracies, all of which boil down to the fact that it does not recognise the end-of-line marker as requiring a line feed (ie, rotation of the typewriter platten) unless it has at least one character before it in the line. This means that many of the goodies mentioned in the Scripsit instruction manual don't work as the book says. These include -

- Line feeds from a succession of "Enter" key-ins.
- Paragraph Format (PF) instruction.
- Header and Footer blocks.
- Top and bottom margin settings, etc.

Some can be made to work by inserting a space before the line end marker and in fact, for my use this is perfectly adequate to get almost all I could want out of Scripsit. It remains as a minor annoyance.

I have now been made aware that this problem can be fixed by:

Machine language patches, of which I now have a large collection.

Getting a replacement PROM from Escon which is designed to fix the problem. I know a number of people who have solved it this way. However, the PROM I received from Escon does not work. We are still negotiating!

Buying the most recent Escon interface which no longer seems to have the problem. These have only been available in Australia for a few months, I believe.

Overall, I would have to say that the Escon interface does the job very well so long as it is not to be left to a junior typist to operate as an idiot-proof system. If used by its owner, and especially if the owner installed it, it does all one could ask at a reasonable price.

Its other giant advantage is its use of the IBM typewriter. Without the ready availability, reliability and service back-up of this unit together with the range of type faces, ribbons etc. which are available for it, the Escon system would not be so attractive.

What are the alternatives? Well, in the USA there are other IBM Selectric conversions but Escon is the only one I know of which is available in Australia. Don't overlook the fact that American electricity is 110v, 60Hz.

Tandy's Daisy Wheel printer is about twice as fast but does not have the versatility (as it can't be used as a pure typewriter) and costs about half as much again as the Escon interface plus a NEW Selectric typewriter. Most people don't buy a new one but convert an existing or second-hand typewriter which usually saves a lot of money.

If you need typewriter quality output, that's it.

So far, not much has been said about Scripsit. In this article it won't be! Suffice it to say that I am using it in an office where W/P must pay its way. Scripsit does this admirably even within the basics covered in the Instruction Book. However, once fluency is gained with it and a little creative thought is applied, there is a whole area of versatility beyond the basics which makes it a delight to use.

(David has recently taken delivery of an OLIVETTI ET-121 typewriter with MICRO-80 interface. Once he has had time to familiarise himself with this machine, he has promised us an objective review of that, too - Ed.)

## LNW RESEARCH EXPANSION INTERFACE BOARDS

**\$79.95 + \$2.00 P&P**

There was so much interest shown in the LNW Research expansion project described in September's MICRO-80 that we decided to import the boards to Australia. They proved so popular that the first batch sold out within 12 hours of landing! We are in stock again, so hurry, while they last. These boards are the basis for a high quality, reliable expansion interface for the TRS-80 (or the SYSTEM 80 via our SYSPAND-80 adaptor). At present we are offering the boards with their comprehensive construction manual. By next month, we will be able to offer modular kits of components and fully built up and tested units. The design of these boards is tried and tested. An expansion interface built around one costs \$100's less than an equivalent Tandy or D-S interface.

## \*\*\*\*\* READERS' REQUESTS \*\*\*\*\*

This column is a regular feature of MICRO-80. In it, we list all those articles, programs, etc. requested by our readers. We invite contributions from Readers to satisfy these requests and will, of course, pay a publication fee for all articles, programs etc. printed. As a guide, we will pay a minimum publication fee of \$10 for any article or review published. In the case of software reviews, we will aim to pay in accordance with the value of the program, up to a maximum of \$25. So, if you write a good review which we publish and the usual selling price of the program in Australia is \$19.95, then we would pay you \$20. In that way, the successful reviewer will get the program he reviews, free. (Make sure you include the selling price in your review). Unfortunately, we cannot afford that policy on hardware(!) so we will pay in accordance with the merits of the review - generally of the order of \$25. Submission of a review for publication automatically means that you are prepared to accept the figure we decide to pay you and no correspondence will be entered into. Payment will be made within 30 days of publication.

## \*\* ARTICLES \*\*

- File handling on the '80
- Description of the functions performed by the Expansion Interface
- Reviews of '80 compatible printers
- Reviews of commercially available software (including that produced by us!)
- Reviews of commercially available hardware
- \* How to SAVE onto Disk, programs such as Analogue clock and Touchtype
- \* A master index to the appropriate sections in the Tandy Manuals in Level I, Level II, DOS etc.
- Comparative reviews of disk drives
- How to convert a Level I program to Level II
- A simple guide to using Level I Arrays
- \* Review of Dunjonquest program
- An explanation of how to make full use of USR, PEEK and POKE statements

## \*\* SOFTWARE \*\*

- \* A m.l. program to enable the break key to work like RESET when using an expansion interface
- Stock market program
- \* Horse racing system
- "Files" program modified for 48K system
- Morse code decoder
- Sub-routine FOrum
- Program to "SET" non-graphical symbols
- A new STAR-TREK game
- Conversational programs (like Eliza)
- 3D programs (such as a maze seen from the inside)

## \*\* HARDWARE \*\*

- Interfacing the '80 to external hardware
- Review on the performance of line filters
- Real Time clock
- \* Radio Teletype/Morse interfacing
- RFI (Radio Frequency Interference) suppression
- Interface for a Teletype printer

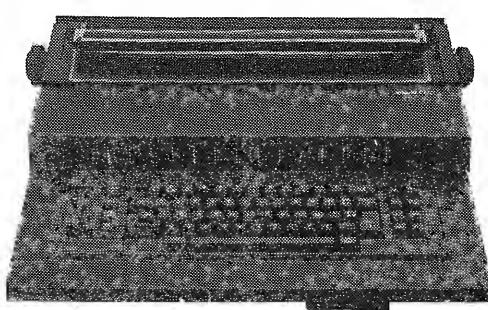
Note:- An \* denotes that we already have some suitable material on hand for this topic.

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### Daisy Wheel Typewriter/Printer

MICRO-80 has converted the new OLIVETTI ET-121 DAISY WHEEL typewriter to work with the TRS-80 and SYSTEM 80 or any other microcomputer with a Centronics parallel port (RS 232 serial interface available shortly). The ET-121 typewriter is renowned for its high quality, fast speed (17 c.p.s.), quietness and reliability. MICRO-80 is renowned for its knowledge of the TRS-80/SYSTEM 80 and its sensible pricing policy. Together, we have produced a dual-purpose machine: an attractive, modern, correcting typewriter which doubles as a correspondence quality Daisy-wheel printer when used with your micro-computer.

How good is it? - This part of our advertisement was typeset using an ET-121 driven by a TRS-80. Write and ask for full details.



ONLY \$1995 INC. S.T.

## \*\*\*\*\* MICRO-BUGS \*\*\*\*\*

In which we correct those errors which seem to creep in, no matter how careful we are.

Well not really bugs this month, rather modifications which will allow previously published programs to run on the SYSTEM 80 as well as the TRS-80. We have had letters from a number of readers with similar information. This one from David Weaver was one of the first to arrive, so we have published it. We thank all those who took the trouble to write in.

## \*\* AMENDMENT TO RON SULLY's SOUND EFFECTS PROGRAM (July 1980) \*\*

Although both the TRS-80 and the SYSTEM 80 use address FFH as the cassette port with bits B0 and B1 for the data, the machines differ in their use of bit B2. In the TRS-80, B2 is used solely for cassette motor control. In the SYSTEM 80 it is also used to enable data paths to both recorders. UNLESS this bit is set high (B2=1) in the SYSTEM 80, NO OUTPUT DATA can pass from the computer to the external recorder socket and NO INPUT DATA can pass from the internal deck to the computer. BIT B2 MUST be set high EACH TIME OUTPUT DATA is fed to port FFH.

To alter SOUND EFFECTS to run on a SYSTEM 80, change Line 10 as follows:-

```
10 DATA 221,33,36,67,221,78,0,121,183,200,221,70,1,62,5,211,255,16,254,221,70,1,6,211,255,16,254,13,19
4,253,66,221,35,221,35,1,255,255,33,48,0,9,218,29,67,195,247,66
```

This alteration keeps bit B2 high by changing B0 value from 1 to 5 and the B1 value from 2 to 6. If no change-over switch is fitted to the SYSTEM 80 to change cassette ports then OUT 254,255 must be typed in.

## \*\* AMENDMENT TO C. E. KENDALL's KEYBOARD BLEEPER PROGRAM (November 1980) \*\*

This program requires the same alteration as SOUND EFFECTS. To alter KEYBOARD BLEEPER, change Line 40 to:-

```
40 DATA
195,96,64,205,227,3,183,200,8,14,20,68,62,5,211,255,16,254,68,62,6,211,255,16,254,13,32,239,8,201,20
5,127,10,205,101,64,201
```

Again, if no switch has been fitted to change over the cassette ports, then OUT 254,255 must be typed in.

## \*\* ALTERATION TO RUN John Peschar's DRAW II PROGRAM ON THE SYSTEM 80 \*\*

David also included this alteration in his letter. DRAW II requires the use of the forward arrow key which is not present on early SYSTEM 80's. This modification makes use of the GREATER THAN and LESS THAN keys instead of the forward and back arrow keys. There is no reason why these modifications should not work equally as well on a TRS-80.

To alter DRAW II, make the following alterations to Lines 10, 40, 70, 130, 140, 240 and 250.

```
10 CLS: CLEAR 500: DEFINT X,Y,B-Z: DEFSTR A : SET(X,Y): V=14400: W=14368
40 IF B=91 OR B+10 OR B+46 OR B=44, F=0 ELSE IF B=26 OR B=27 OR B=60 OR B=62, F=1
70 IF B=108 THEN 500 ELSE IF B=115 THEN 400 ELSE IF B=99 THEN CLS ELSE IF B=110 THEN 600 ELSE IF
B=100 THEN 300 ELSE IF B=114 THEN A1="" :C=0
130 IF (B=60 OR B=44) AND X-1>=0, X=X-1
140 IF (B=62 OR B+46) AND X+1<=127, X=X+1
240 IF (PEEK(W) AND 16)=16 AND X-1>=0, X=X-1 : E=1
250 IF (PEEK (W) AND 64)=64 AND X+1<=127, X=X+1 : E=1: RETURN ELSE RETURN
```

## \*\* ALTERATION TO RUN A. F. WEST's SOUND PROGRAM ON THE SYSTEM 80 (July 1980) \*\*

Allan Smyth was another reader who sent in similar amendments to KEYBOARD BLEEPER. In addition, he included the following amendment to SOUND to enable it too to work on the SYSTEM 80. First, add OUT 254,16 to your BASIC program then, at the bottom of page 43, change the line of HEX to:-

```
7FE0 00 00 CD 7F 0A 3E 01 0E 00 1E 04 00 00 45 2F E6
```

## \*\*\*\*\* '80 USERS' GROUPS \*\*\*\*\*

The following is a list of '80 Users' Groups. If you have a group that is not included here, please let us know about it so that we can publish details. Owners of System '80s are welcome at all the groups.

BRISBANE: Contact: Mr. Lance Lawes,  
Tel: Home (07)396 2998  
Bus. (07)268 1191 Ext.15  
MEETINGS: 1st Sunday of the month at 2 p.m. at 21 Rodney St. Lindum, 4178.

MELBOURNE: EASTERN SUBURBS - 1  
Contact: Mr. John Fletcher, 89 0677 between 9-4

EASTERN SUBURBS - 2  
MEETINGS: 3rd Wednesday of the month at Kingswood College, 355 Station St. Box Hill.

NORTHERN AND WESTERN SUBURBS COMPUTER USERS GROUP  
MEETINGS: Every 2nd Thurs. at 7 pm. at 142 Pascoe Vale Rd., Moonee Ponds  
Contacts: David Coupe (03) 370 9590  
Clive Budd (03) 370 2917

FRANKSTON: PENINSULAR GROUP  
(Vic) MEETINGS: 2nd Tues. of the month (except Jan.)  
Contact: M.G. Thompson (03) 772 2674

GEELONG: GEELONG COMPUTER CLUB  
MEETINGS: 2nd Tues. of the month at TYBAR Engineering, Hampton St. Newtown.  
Contact: The Geelong Computer Club,  
P.O. BOX 6, Geelong, 3220

DARWIN: Contact: Tony Domigan, P.O. Box 39086,  
Winnellie, N.T.5789.

ADELAIDE: Contact: Rod Stevenson, 51 5241 between 9-4.

CANBERRA: MEETINGS: 3rd Thurs. of each month at 7.30 pm in:-  
Urambi Village Community Centre, Crozier Circuit, Kambah.  
Contact: Bill Cushing, 10 Urambi Village, Kambah, ACT 2902. ('Phone 31 6399)

TOWNSVILLE: TOWNSVILLE AMATEUR RADIO CLUB  
MEETINGS: 2nd Tues. of the month at 7.30 pm at:-  
The State Emergency Service Headquarters,  
Green St., West End.  
Contact: F.G. Sturges, P.O. BOX 5100 MSO, Townsville

## \*\* UNITED KINGDOM \*\*

NEWCASTLE: NPCS (Newcastle Personal Computer Society)  
Contact: John S. Bone 0632 770036

## \*\* NEW ZEALAND \*\*

AUCKLAND MEETINGS: 1st Tues. of each month at:-  
NZ Solenoid Co. Ltd.,  
28 Kalmia Street, Ellerslie, Auckland.

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## \*\*\*\*\* INPUT/OUTPUT \*\*\*\*\*

FROM: Ron Kehn, 27 Guys Rd., Korumburra, Vic. 3450

I recently purchased an RS 232 board for my TRS-80 expansion interface. It was my hope to connect the TRS-80 to an integral data IP 125 printer. I copied the software I/O driver as per the RS 232 manual but I am unable to get anything printed out. If you (or any reader) have attached the TRS-80 to the IP 125 serial printer I would appreciate hearing what you did to modify the software and/or hardware.

(If any reader has solved this problem, perhaps they would contact Ron direct - Ed.)

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## \*\*\*\*\* MARKET PLACE \*\*\*\*\*

Market place is available to any reader who has hardware to dispose of. An entry costs nothing - you pay MICRO-80 \$5.00 or 5% commission, whichever is the greater - up to a maximum of \$30, after the goods are sold. The commission is calculated on your advertised price.

EXATRON STRINGY FLOPPY, excellent condition. Includes wafers. \*\*\*\*\* \$300 \*\*\*\*\*  
Phone (089) 89 6016 (Business) ask for Peter Quinn

SYSTEM 80 L2/16K + Dick Smith monitor + Address/Mailing list and Airmail Pilot programs. This equipment is only a few weeks old and in perfect condition. Total list price of hardware and software is \$951.50, will sell for:

\*\*\*\*\* \$850 \*\*\*\*\*

P. S. Martin, 191 Stuart Street, Blakehurst NSW 2021 Phone (02) 546 7090

Radio shack QUICK PRINTER: 150 LPM on 4.75" wide aluminised paper. Software selectable 80,40,or 20 characters per line. Upper-case and lower-case with full descenders. Automatic underlining. Seldom used and in excellent working order. Catalogue price \$699. Will sell for:

\*\*\*\*\* \$400 \*\*\*\*\*

Mike Riley, 15a Hunter Street, Lakes Entrance Vic. 3909. Phone:(051) 551812 Bus. (051) 552216 (AH)

MICROLINE 80 DOT MATRIX PRINTER: excellent condition with printer cable, ready to plug into bus extender and go. Full graphics, 3 print sizes and detailed instructions and tips.

\*\*\*\*\* \$850 o.n.o. \*\*\*\*\*

Mr. J. F. Lamich, 116a Raglan Street, Mosman, NSW 2088. Phone: (02) 411 7166 Bus. hours.

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## \*\*\*\*\* SOFTWARE SECTION \*\*\*\*\*

## SHOOTING GALLERY (L1/4K)

by C. Stobert

The game starts by first drawing some reeds at the bottom of your screen. The sub-routine for this starts at Line 800. At Line 250, each shooting position is placed on the screen (in the space between each set of reeds). Lines 320 to 350 decide where the ducks are to appear whilst Lines 360 to 370 place them on the screen. Line 410 is the start of the INKEY simulator. For new readers, this is done by SETting various points on the screen, placing the cursor so that, if a certain key is pressed, one of the points is overwritten by the cursor, then acting according to whichever point is missing. Line 415 is testing point (3,0). If (3,0)=1 (ie. if it is ON), 415 is repeated.

If (3,0)=0 (ie. if it is OFF), the program drops to the next line. As you can see from the REM statement at Line 500, this is the start of the shoot trace. L is the next position on the Y axis and P is the next position on the X axis. Line 520 increments P and then decides whether there is a duck present at the next position to be occupied by the bullet. This test is not really necessary. It has been added to demonstrate that you can make your '80 look for a duck before the bullet actually gets there. Line 540 tests each point adjacent to the bullet, horizontally (that is why the earlier test is not necessary). If one of the ducks is hit, then Line 600 is used. Line 680 decides whether there has been an even number of hits. Happy shooting!

```

1 REM C.STOBERT
2 REM 21 SHERWOOD CRS. NTH. DANDENONG VIC. 3175
10 C.
20 P.A.209,"<<< SHOOTING GALLERY >>>
30 F. I=1T075:J=R.(32767):N.I
40 D.5,1,15,2,46,3,60,4,960,A,992,B,1014,C
50 C.:P.:P."TWO DUCKS WILL APPEAR ON THE SCREEN
60 P.:P."YOUR FIRING POSITIONS WILL APPEAR ON THE
70 P."BOTTOM OF THE SCREEN
80 P.:P."WHEN THE DUCKS APPEAR
90 P."YOU FIRE BY PRESSING THE APPROPRIATE KEY
100 P.:P.:I."PRESS <ENTER> TO CONTINUE ";A$:C.
110 F.N=1T07:READA,A$#
130 P.A.A,A$;:N.N
140 P.A.128,"PRESS <ENTER> TO SHOOT ON LINE B-1":P.
150 P."PRESS <SPACE> TO SHOOT ON LINE B-4":P.
160 P."PRESS <I> TO SHOOT ON LINE C-2":P.
170 P."PRESS <I> TO SHOOT ON LINE A-3":P.
180 P.:I."PRESS <ENTER> TO CONTINUE ";A$:C.
190 P.:P."YOU HAVE 10 SHOTS
200 P."TO SHOOT AS MANY DUCKS AS POSSIBLE

```

210 P.:P."AFTER AN EVEN NUMBER OF HITS  
220 P."TWO NEW DUCKS WILL APPEAR ON THE SCREEN  
230 P.:P.:I."PRESS <ENTER> TO START ";A\$:C.  
240 GOS.800  
250 F.N=46T047:S.(0,N):S.(64,N):S.(109,N):N.N  
260 S=0:H=0  
300 REM- PLACEMENT OF DUCKS  
310 F.N=128T0704S.64:P.A.N:N.N:P.A.1,  
320 V=R.(30)+3  
330 W=R.(7)\*3+6  
340 X=R.(86)+20  
350 Y=R.(3)\*3+21  
360 F.N=V-2TOV+0:S.(N,W):N.N:S.(N,W-1)  
370 F.N=XTOX-2S.-1:S.(N,Y):N.N:S.(N,Y-1)  
400 REM- FIRING CHECK  
410 P.A.1,:F.N=1T07S.2:S.(N,0):N.N  
415 GOS.1000:IFP.(3,0)G.415  
420 IFP.(7,0)=0Z=64:J=-3.92:G.500  
430 IFP.(5,0)=0Z=64:J=4.15:G.500  
440 IFP.(1,0)=0Z=109:J=-5.77:G.500  
450 IFP.(3,0)=0Z=0:J=6.69:G.500  
460 G.415  
500 REM- SHOOT TRACE  
510 S=S+1:P=Z:F.L=42T06S.-3  
520 P=P+J:IFP.(P,L)G.600  
530 S.(P,L):IFL>32G.580  
540 IF(P.(P+1,L))+(P.(P-1,L))G.600  
580 GOS.1000:R.(P,L):N.L:IFS=10G.700  
590 G.410  
600 REM- HIT SEQUENCE  
610 H=H+1:F=I.(L/3)\*64+I.(P/2)-66  
620 F.B=1T03  
630 F.N=-R.(3)TOR.(3)S.R.(3):S.(P,L+N):S.(P+N,L):N.N  
640 F.C=FTOF+128S.64:P.A.C,"";A.0;:N.C  
650 N.B  
670 IFS=10G.700  
680 IFI.(H/2)=H/2G.310  
690 GOS.1000:G.410  
700 REM- END OF SHOTS  
710 P.A.258,"YOU HAVE HAD YOUR 10 SHOTS  
720 P.A.324,"YOU SCORED";H;"HITS  
730 P.A.456,:IFH>8P."MARKSMAN  
740 IFH>4P."FAIR SHOOTING":G.750  
750 P."L@K OUT FELLOW HUNTERS  
760 Y=1:N=0  
770 P.A.500,"WANT ANOTHER TRY- (YES OR NO) ";:I.D  
780 IFD=0E.  
790 G.260  
800 REM- REEDS  
805 F.N=6T058:S.(N,47):S.(N,46):N.N  
810 F.N=70T0103:S.(N,47):S.(N,46):N.N  
815 F.N=115T0127:S.(N,47):S.(N,46):N.N  
820 M=45  
825 READN:IFN=999M=M-1:G.825  
830 IFN=9999RET.  
835 S.(N,M):G.825  
840 D.17,18,24,25,26,27,28,29,35,36  
845 D.37,38,39,44,45,76,91,82,84,89  
850 D.90,99,118,119,120,121,122,123,125,999  
855 D.14,16,17,18,24,25,26,27,28,35  
860 D.36,37,38,39,44,45,72,75,76,80  
865 D.82,84,89,90,96,98,100,119,120,121  
870 D.123,126,999  
875 D.15,18,24,26,27,35,36,37,38,39  
880 D.44,46,50,73,74,79,82,84,87,89  
885 D.91,97,98,118,119,120,121,123,127,999  
890 D.18,22,24,26,27,30,34,36,37,38  
895 D.39,44,47,48,49,78,82,84,88,89  
900 D.91,94,114,117,119,120,121,123,127,999  
905 D.17,18,22,23,24,26,28,29,33,36  
910 D.37,38,39,45,75,77,82,84,92,93  
915 D.115,116,119,121,124,999  
920 D.24,26,32,36,39,46,47,48,49,76  
925 D.77,81,84,119,121,125,999

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930 D.25,26,29,31,36,38,40,81,84,117
935 D.119,122,126,999
940 D.30,31,36,38,40,43,80,84,86,118
945 D.119,122,123,999
950 D.35,36,38,40,41,42,78,80,84,85,999
955 D.36,38,79,80,9999
1000 REM- DUCK MOVEMENT
1010 S.(V+1,W-1):R.(U-2,W)
1020 S.(X-3,Y-1):R.(X,Y)
1030 S.(U+1,W):R.(U,W-1)
1040 S.(X-3,Y):R.(X-2,Y-1)
1050 U=U+1:X=X-1
1060 IFX>2RET.
1070 F.Q=0T03:F.R=Y-1TOY:R.(Q,R):N.R:N.Q
1080 X=127:RET.

```

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## MATURITY TEST (L1/4K)

by Br. P. Van Eeken

Everyone else is asking questions to test this and that, now it is our turn. The big question; how mature are you really?. By answering all the questions posed in this program, you will be able to find out. (If you get a low score, this is only for fun, isn't it?).

The program works in the following manner:-

Line 4 zeros all arrays from A(0) to A(25), this is where your answers will be stored. The questions start at Line 10 and finish at Line 135. Once all the questions have been answered, the program jumps to Line 800 which tells you your score, what that score means and asks you to press (ENTER). Once you press (ENTER), the program goes to Line 200 and asks: "would you like a run down of your answers?". If you answer yes, it goes back to Line 10 then proceeds to tell you how much you scored for each question and your cumulative score. If you answer no, the program asks the next person to press (CLEAR). If you would like to see similar programs published, please let us know. If you have already written a similar program, why not send it in?

```

1 REM BY BR. P. VAN EEKEN
2 C.
3 I."PRESS ENTER";A$
4 F.X=0T.25:A(X)=0:N.X
5 Y=0:N=1:S=0:C=0:B$=DO YOU
6 Z=0:J=3:G=0:F=1
7 C.
8 P."AFTER YOU ANSWER THE FOLLOWING 25 QUESTIONS, I WILL
9 P."BE ABLE TO TELL YOU HOW MATURE A PERSON YOU ARE.
10 P.AT512,"DO YOU FEEL THAT YOU CAN ALWAYS DO THINGS BETTER
11 P."THAN ANYONE ELSE";:GOS.500
15 P."OFTEN APOLOGIZE: I HAVE SUCH A POOR MEMORY";:GOS.500
20 P."OFTEN USE THE EXCUSE: IF I ONLY HAD MORE TIME";:GOS.500
25 P."FREQUENTLY SAY: I'M JUST NOT SOCIABLE";:GOS.500
30 P."OFTEN SAY: I CAN NOT DO IT";:GOS.500
40 P."OFTEN SAY: I INTENDED TO DO IT";:GOS.500
45 P."EXCUSE YOURSELF WITH: I CAN NOT HELP IT";:GOS.500
50 P."EXCUSE YOURSELF WITH: I'M TOO TIRED";:GOS.900
55 P."MUST YOU BE CONSTANTLY ENTERTAINED";:GOS.900
60 P."MUST YOU USUALLY BE THE CENTRE OF ATTRACTION";:GOS.500
65 F=4:P."ALWAYS TRY TO TELL OTHER PEOPLE WHAT TO DO";:GOS.500
70 P."ANGER QUICKLY";:GOS.500
75 P."OFTEN SAY: PEOPLE ARE NOT FRIENDLY";:GOS.900
80 P."IS IT HARD FOR YOU TO ADMIT YOU ARE WRONG";:GOS.900
85 P."IF YOU DON'T LIKE A PERSON, DO YOU REFUSE TO DEAL";
86 P."WITH THEM";:GOS.500
90 F=2:P."EXPECT EVERYONE TO LIKE YOU";:GOS.500
95 P."ASSERT: I DON'T NEED ANYONE'S HELP";:GOS.500
100 P."ALWAYS EXPECT GRATITUDE";:GOS.500
105 P."FREQUENTLY SAY: IT WAS MY IDEA";:GOS.500
110 P."FREQUENTLY GET INTO ARGUMENTS";:GOS.900:F=1
115 P."MUST YOU HAVE EVERYTHING YOU WANT";:GOS.900
120 P."HAVE YOU A DRIVE FOR PERFECTION";:GOS.900
125 P."MUST YOU ALWAYS HAVE THINGS YOUR WAY";:GOS.900
130 P."DOES SOMEONE ELSE'S SUCCESS TROUBLE YOU";:GOS.900
135 P."IS IT DIFFICULT FOR YOU TO TRUST ANYONE";:GOS.900

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```
140 G.800
200 Z=-1:H=0:B$=DO YOU
205 C.:IFJ=1G.265
210 C.:I."WOULD YOU LIKE A RUN DOWN ON YOUR ANSWERS ";A
220 IFA=1G.265
230 J=1:G.10
265 P.A.128,"PLEASE LEAVE NOW FOR THE NEXT PERSON.
266 P.:P."THANK YOU. GOODBYE.
280 P.A.896,"NEXT PERSON PRESS CLEAR":S.(0,47)
290 IFP.(0,47)G.290
300 G.4
500 GOS.900:P.B$;" ";:RET.
700 H=H+1
701 IFA(H-1)=0T.705
702 A$=NO
703 G.709
705 A$=YES
709 P." ?":P.:P."QUESTION";H:P.
710 P."YOU GOT ";A(H-1);"POINTS FOR YOUR ANSWER OF ";A$"
711 G=G+A(H-1)
715 P.
720 P."BRINGING YOUR TALLY TO ";G
723 P.:P.
725 I."PRESS ENTER FOR THE NEXT QUESTION ";A$:C.
730 RET.
800 C.:IFZ=-1G.810
801 S=S*2
802 IFA>0G.810
803 C.:P."APOLOGIES. THERE HAS BEEN A MALFUNCTION.":P.:P.
804 P."PLEASE RESTART.":P.:P.:A=0:G.3
810 P."YOUR MATURITY QUOTIENT SCORES A TOTAL OF ";S;"POINTS.
811 P."YOUR MATURITY RATING THEREFORE, IS":
819 A$=A SCORE OF
820 P.A$;" 75 OR MORE IS SUPER.
825 P.A$;" 65 TO 74 IS EXCELLENT.
830 P.A$;" 55 TO 64 IS GOOD.
835 P.A$;" 45 TO 54 IS FAIR.
840 P.A$;" 35 TO 44 IS POOR.
845 P.
850 P."KEEP IN MIND THAT ONLY AFTER THE AGE OF 60 ARE YOU
860 P."LIKELY TO RATE SUPER. AGE IS NOT NECESSARY FOR
870 P."MATURITY, BUT THE MORE YEARS YOU LIVE, THE GREATER
871 P."IS YOUR OPPORTUNITY TO DEVELOP YOUR MATURITY SCORE.
872 P."IF YOU SCORE OVER 75 IN AN EARLIER STAGE OF LIFE -
873 P."(AND IF IT IS AN HONEST SCORE BASED ON GENUINE THOUGHT)
874 P."THEN TRULY YOUR MATURITY IS EXTRAORDINARY."
875 GOS.1000
879 IFS<75G.895
880 F.X=1T.20
881 P.A.100;" ";
882 F.Y=1T.100:N.Y
883 P.A.100:B$;
884 P.A.960;
885 F.Y=1T.100:N.Y
890 N.X
891 G.899
895 P.A.100:B$;
899 P.A.228:I."";A$:G.200
900 IFZ<>-1G.902
901 GOS.700:RET.
902 P." ";I.A(C):IFA(C)=1G.910
903 IFA(C)=0G.950
904 P.:P."I DO NOT UNDERSTAND YOU, PLEASE ANSWER AGAIN.
905 G.902
910 S=S+A(C)*F
911 A(C)=A(C)*F*2
920 C.
950 C.:C=C+1:P.A.512::RET.
1000 IFS>74B$="SUPER":RET.
1005 IFS>64B$="EXCELLENT":RET.
1010 IFS>54B$="GOOD":RET.
1015 IFS>44B$="FAIR":RET.
1020 IFS>34B$="POOR":RET.
1025 B$="VERY LOW":RET.
```

CWORD (L2/4K)

BY L.G. RHEDEY 11

Crossword fans will love this program. It enables you to search a data bank of words to find (hopefully) that one that has eluded you. For example:- if in your crossword, you are searching for a missing word, (let's say the word is computer) and the only letters you have are C,U and E. then, RUN the program and type in -- C...U.E. entering a period (.) wherever a letter is unknown. The '80 will search the data statements for EVERY word that fits the pattern and display them. It is then up to you to select the correct word from those displayed. If no letters are known, type in the number of periods to match the length of the word, ie: ..... will list all five letter words.

The strength of the program lies in the size of its data bank (lines 1000 - 26000). The listing includes a few words only for demonstration purposes, since you will certainly wish to set up your own data bank on a particular subject (T.V. crosswords for instance). Without data, this program requires only 500 bytes, leaving plenty of room even for 4K users.

The program operates by taking an input word (A\$) and comparing it with one read from data (B\$). If their length is not equal the next word from data is read. If their lengths are equal, the two words are compared letter for letter for a match. If the next letter of A\$ is a period, it is passed over. The process continues until the complete data bank has been searched. You might like to speed up operation by dividing the data bank into segments according to the length of the word for which you are searching. You could then alter the program logic so that it searches only the five letter word segment for five letter words, the six letter word segment for six letter words and so on.

```

10 REM ** CWORD BY L. G. RHEDEY **
20 REM ** 97 BRINGELLY RD.,      **
30 REM ** KINGSWOOD NSW 2750    **
40 REM ** 16/11/80              **
50 CLS
60 GOT080
70 CLS:RESTORE
80 PRINT"ENTER WORD TO BE SEARCHED FOR. TYPE . WHERE LETTER NOT KNOWN";
90 PRINT:PRINT:PRINT
100 INPUTA$
110 READB$
120 IFB$$="$GOTO210
130 Z=LEN(A$):C=LEN(B$)
140 IFZ<>CGOTO110
150 FORX=1TOZ
160 IFMID$(A$,X,1)=". "GOTO190
170 IFMID$(A$,X,1)=MID$(B$,X,1)THEN GOTO190
180 GOTO110
190 NEXTX
200 PRINTB$,:GOTO110
210 PRINT:PRINT
220 PRINT"AGAIN (Y/N)";
230 I$=INKEY$:IFI$=" "GOTO230
240 IFI$="Y"GOT070:ELSEEND
1000 DATAAPPLE, APE, ASK, ANOTHER, ACCEPT, ACCENT, AMPERE
2000 DATABUS, BUSINESS, BANK, BOAT, BAKE, BEAUTY, BUTTER
3000 DATACAKE, CANDLE, CUP, CALCULATOR, COMPUTER, COMPANY
4000 DATADOG, DUST, DISK, DATA, DIAGRAM, DIMENSION, DARK
5000 DATAELEPHANT, EAT, ENTER, ELECTRICITY, EXTENSION
6000 DATAFOG, FABLE, FEET, FIRE, FISH, FUNCTION, FAVOUR, FEEBLE
7000 DATAGOAT, GAMBLE, GAIN, GAME, GALLOWS, GUN, GUM, GAS
8000 DATAHELP, HINDER, HAPPY, HOSTAGE, HOME, HOUSE, HUNGER
9000 DATAINK, INVISIBLE, INFER, INEVITABLE, INDUSTRY
10000 DATAJUST, JUMBLE, JADE, JUNE, JUMBO, JAM, JIFFY
11000 DATAKEETLE, KNIFE, KNOT, KEEP, KEEN, KNEE, KNAVE, KNIGHT
12000 DATALEMON, LIME, LANGUAGE, LEVER, LOVE, LISTEN, LAKE
13000 DATAMINCE, MICE, MUSCLE, MUSIC, MUSTARD, MICRO
14000 DATANUMBER, NIMBLE, NEED, NEXT, NEAR, NOISE, NAVY
15000 DATAORANGE, ORGANISATION, ORACLE, ORDER, OPEN, OVEN
16000 DATAPURCHASE, PROGRAMME, PRIDE, PUP, PEST, POSITIVE
17000 DATAQUIET, QUAKE, QUIVER, QUIT, QUIRK, QUERY

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18000 DATARIIVER, RAMPAGE, RUST, ROOSTER, RECEIVER, RESPECTABLE
19000 DATASEARCH, SIMPLE, SOW, SUMP, STANDING, SERVE, SHOCK
20000 DATATUMBLE, TEST, TEMPER, TRICK, TUG, TOUGH, TIMBER
21000 DATAUMBRELLA, UNCLE, UNDER, USELESS, UMPIRE, UNDRESS
22000 DATAVERIFY, VOCAL, VOICE, VOID, VIRILE, VANITY
23000 DATAWATER, WASTE, WONDER, WORK, WORRY, WAGE, WHISKY
24000 DATAXENON, XRAY, XYLOPHONE, XYLEM, XYLONITE
25000 DATAYACHT, YARD, YODLE, YOUR, YANKEE, YESTERDAY, YELLOW
26000 DATAZIP, ZERO, ZOO, ZEAL, ZINC, ZENITH, ZOOM, ZYGOTE
30000 DATA$
```

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## AUTOMATIC CHESS BOARD (L2/16K)

BY G. THOMSON

This program fulfils the function of an "automatic" chess board. It presents a diagrammatic representation of a chess board on the screen, with the pieces set out correctly. Each player, in turn, enters a move which the program tests and if valid, registers by moving the corresponding pieces on the screen. The program knows most of the rules of chess and, to the author's knowledge, the only moves it will not accept are "En Passant" and "Castling". If an illegal move is entered, the program will wipe it and ask again. Moves are entered alternatively between white and black, with white having the first move.

If the board numbering is required to assist you in defining your move, hit..... "H" for help.  
If these numbers are no longer required, hit..... "W" for wipe.

All pieces are formed from three graphic blocks joined in a string and are placed on the screen using PRINT@'s rather than POKE's or SET's, so the graphic display speed is no problem. The program takes 11000 bytes and therefore requires a machine of at least 16K. It was written on a SYSTEM 80 and considering the short amount of time for which Garry (16 years old) could have had his computer, he is to be congratulated.

```

0 CLS
10 PRINT @ 284, "CHESS";
20 PRINT @ 410, "WRITTEN BY"
30 PRINT @ 526, "GARRY THOMSON - 3 DELRAY ST. OAKEY"
40 CLEAR (2000)
50 REM

CHESS BY GARRY THOMSON ..... 3 DELRAY ST. OAKEY 4401
(076) 911703

110 DEFINT I,N,A,B,C:DEFSTR S,P:DIM S(8,16),L$(15),P(8,8):BS$=CHR$(8):C$=CHR$(9E)
150 FOR I=1 TO 12: READ A,B,C: L$(I)=CHR$(A)+CHR$(B)+CHR$(C):NEXT I
165 REM WHITE PIECES ===== WHITE
170 DATA 171,140,151
180 DATA 162,188,140
190 DATA 136,191,132
200 DATA 138,188,133
210 DATA 185,179,182
220 DATA 160,191,144
230 REM BLACK PIECES ===== BLACK
240 DATA 148,179,168
250 DATA 157,131,179
260 DATA 183,128,187
270 DATA 131,131,186
280 DATA 134,140,137
290 DATA 159,128,175
300 FOR I = 1 TO 12
310 ON I GOSUB 60000,60010,60020,60030,60040,60050,60060,60070, 60080,60090,601
00,60110
320 NEXT I
325 CLS:PRINT"THIS PROGRAM KNOWS THE RULES OF CHESS BUT DOES NOT
PLAY FOR ITSELF. IT REQUIRES THE PLAYERS TO ENTER THEIR MOVES
IN ORDER AS ONE COORDINATE FOLLOWED BY 'TO' THEN THE NEXT
```

EG... '1,7T01,B'

FOR NUMBERING OF THE BOARD\*;  
 326 PRINT" HIT .....H (FOR HELP)  
 TO REMOVE THE NUMBERS HIT .....W (FOR WIPE)

HIT ANY KEY TO CONT\*  
 327 Q\$=INKEY\$:IF Q\$="" THEN 327  
 330 FOR I=1 TO 8 STEP 2  
 340 FOR J=1 TO 16 STEP 4  
 345 S(I,J+2)=STRING\$(5,128): S(I,J+3)=STRING\$(5,128)  
 350 S(I,J)=STRING\$(5,191): S(I,J+1)=STRING\$(5,191)  
 353 S(I+1,J+2)=STRING\$(5,191): S(I+1,J+3)=STRING\$(5,191)  
 355 S(I+1,J)=STRING\$(5,128): S(I+1,J+1)=STRING\$(5,128)  
 360 NEXT J,I:CLS  
 372 INPUT " WHITE PLAYER ";N1\$  
 375 INPUT " BLACK PLAYER ";N2\$  
 380 FOR I= 16 TO 1 STEP -1  
 390 FOR J= 1 TO 8  
 400 PRINT S(J,I);  
 410 NEXT J  
 415 IF J>7 AND I<2 THEN 430  
 420 PRINT  
 430 NEXT I  
 432 GOTO 435  
 433 FOR A=1 TO 16 :PRINT STRING\$(64,191);:NEXT A  
 435 N=897  
 440 FOR I= 1 TO 8  
 450 FOR J= 1 TO 8  
 470 PRINT @ N,P(J,I);  
 475 V(J,I)=N  
 480 N=N+5  
 490 IF POS(0) > 35 THEN N=N-168  
 500 NEXT J,I  
 520 PRINT @ 45,"C H E S S";  
 522 PRINT @ 109,STRING\$(9,131);  
 525 F=(F=0):IF F=0 THEN Q\$=N2\$+" S MOVE- " ELSE Q\$=N1\$+" S MOVE- "  
 540 PRINT @ 233, STRING\$(23,128);:PRINT @ 297,STRING\$(22,128);:PRINT @ 233,Q\$;  
 541 PRINT @ 297,"- ";:E=0:W=0:B\$=""  
 550 A\$ = INKEY\$ : IF A\$ = " " OR A\$="" THEN 550  
 555 IF A\$="H" GOTO 65000  
 556 IF A\$=BS\$ IF LEN(B\$)>0 THEN B\$=LEFT\$(B\$,LEN(B\$)-1):PRINTBS\$;A\$;C\$;:GOTO 550  
 :ELSE GOTO 550  
 557 IF A\$="W" GOTO 65050  
 558 IF LEN(B\$)>19 OR A\$=CHR\$(10) THEN 550  
 560 IF A\$ <> CHR\$(13) THEN PRINTBS\$;A\$;C\$;: B\$=B\$+A\$:GOTO 550  
 565 PRINTBS\$;  
 570 IF LEN(B\$) <> 8 THEN 540  
 580 IF MID\$(B\$,4,2) <> "TO" THEN 540  
 590 A=VAL(LEFT\$(B\$,1))  
 600 B=VAL(MID\$(B\$,3,1))  
 610 C=VAL(MID\$(B\$,6,1))  
 620 D=VAL(RIGHT\$(B\$,1))  
 622 IF A\*B\*C\*D=0 THEN 540  
 623 IF A>8 OR B>8 OR C>8 OR D>8 THEN 540  
 625 IF A+B+C+D>32 THEN 540  
 630 FOR I=1 TO 12  
 640 IF P(A,B) = L\$(I) THEN 660  
 650 NEXT I  
 655 GOTO 540  
 660 IF F=0 AND I<7 THEN 540  
 670 IF F=-1 AND I>6 THEN 540  
 675 J=0  
 680 IF P(C,D)="" THEN 740  
 690 FOR J= 1TO 12  
 700 IF P(C,D) = L\$(J) THEN 710  
 702 NEXT J  
 705 GOTO 540  
 710 IF F=0 AND J>6 THEN 540  
 720 IF F=-1 AND J<7 THEN 540  
 730 IF J=5 OR J=11 THEN W=1  
 740 ON I GOSUB 60200,60250,60300,60350,60400,60450,60200,60250,60300,60350,60400,  
 ,60450

```

750 IF E=1 THEN 540
760 PRINT @ V(A,B)-1,S(A,B*2);
770 PRINT @ V(C,D),P(C,D);
780 IF W=1 THEN 800
790 GOTO 525
800 PRINT @ 745,"THE GAME IS OVER";
810 PRINT @ 810,"TO PLAY AGAIN HIT-A";
820 J$=INKEY$:IF J$<>"A" THEN 820
825 PRINT @ 875 , " I'LL PREPARE";
830 FOR I=1 TO 8:FOR J=1 TO 8
840 P(I,J)=""
850 NEXTJ,I
860 GOTO 300
59998 REM THESE SUB ROUTINES ALLOCATE THE GRAPHIC SHAPES
59999 REM =====
60000 P(1,8)=L$(I):P(8,8)=L$(I)
60005 RETURN
60010 P(2,8)=L$(I):P(7,8)=L$(I)
60015 RETURN
60020 P(3,8)=L$(I):P(6,8)=L$(I)
60025 RETURN
60030 P(4,8)=L$(I)
60035 RETURN
60040 P(5,8)=L$(I)
60045 RETURN
60050 FOR N=1 TO 8 :P(N,7)=L$(I):NEXT N
60055 RETURN
60060 P(8,1)=L$(I):P(1,1)=L$(I)
60065 RETURN
60070 P(2,1)=L$(I):P(7,1)=L$(I)
60075 RETURN
60080 P(3,1)=L$(I):P(6,1)=L$(I)
60085 RETURN
60090 P(4,1)=L$(I)
60095 RETURN
60100 P(5,1)=L$(I)
60105 RETURN
60110 FOR N=1 TO 8 :P(N,2)=L$(I):NEXT N
60115 RETURN
60200 REM =====MOVING ROOKS
60205 IF AK>C AND B=D THEN G1=A:G2=C:GOTO 60221
60207 IF B>D AND A=C THEN G1=B:G2=D:GOTO 60211
60209 E=1 : RETURN
60211 IF G1<G2 THEN S!=1 ELSE S!=-1
60213 FOR G=G1 TO G2 STEP S!
60214 G3=(G>>G1)AND (G>>G2)
60215 IF P(A,G)<>"" AND G3=-1 THEN E=1:RETURN
60217 NEXT G
60219 GOTO 60229
60221 IF G1<G2 THEN S!=1 ELSE S!=-1
60223 FOR G=G1 TO G2 STEP S!
60224 G3=(G>>G1)AND (G>>G2)
60225 IF P(G,B)<>"" AND G3=-1 THEN E=1:RETURN
60227 NEXT G
60229 P(C,D)= P(A,B)
60231 P(A,B)= ""
60233 RETURN
60250 REM =====MOVING KNIGHTS
60255 IF ((A-C)[2+(B-D)[2]<>5 THEN E=1 : RETURN
60260 P(C,D)=P(A,B)
60265 P(A,B)=""
60270 RETURN
60300 REM =====MOVING BISHOPS
60305 IF INT(ABS(ABS(A-C)-ABS(B-D)))<>0 THEN E=1 : RETURN
60310 IF AKC THEN G1=A :G2=C :G3=B :GOTO 60327
60315 G1=C:G2=A : G3=D
60320 IF B>D THEN S!=1:GOTO 60330
60325 S!=-1:GOTO 60330
60327 IF B<D THEN S!=1:GOTO 60330
60329 S!=-1
60330 FOR G= G1 TO G2
60335 G4=(G>>G1)AND (G>>G2)
60340 IF P(G,G3)<>"" AND G4=-1 THEN E=1:RETURN
60342 G3=G3+S!
```

## DON'T BE HELD BACK BY AN ANTIQUATED DISK OPERATING SYSTEM MOVE UP TO

### NEWDOS 80

NEWDOS 80 is a completely new DOS for the TRS-80 SYSTEM 80. It is well-documented, bug free and increases the power of your system many times over. It is upward compatible with TRSDOS AND NEWDOS (ie TRSDOS and NEWDOS+ programs will run on NEWDOS 80 but the reverse is not necessarily so).

These are just a few of the many new features offered by NEWDOS 80.

- \* New BASIC commands that support variable record lengths up to 4095 bytes long.
- \* Mix or match disk drives. Supports any track count from 18 to 96. Use 35, 40, 77 or 80 track 5½ inch mini disk drives, 8 inch disk drives OR ANY COMBINATION.
- \* An optional security boot-up for BASIC or machine code application programs. User never sees "DOS-READY" or "READY" and is unable to "BREAK", clear screen or issue any direct BASIC statements, including "LIST".
- \* New editing commands that allow program lines to be deleted from one location and moved to another or to allow the duplication of a program line with the deletion of the original.
- \* Enhanced and improved RENUMBER that allows relocation of subroutines.
- \* Create powerful chain command files which will control the operation of your system.
- \* Device handling for routing to display and printer simultaneously.
- \* MINIDOS — striking the D, F and G keys simultaneously calls up a MINIDOS which allows you to perform many of the DOS commands without disturbing the resident program.
- \* Includes Superzap 3.0 which enables you to display/print/modify any byte in memory or on disk.
- \* Also includes the following utilities:
  - Disk Editor/Assembler
  - Disassembler (Z80 machine code)
  - LM offset — allows transfers of any system tape to Disk file — automatically relocated.
  - LEVEL I — Lets you convert your computer back to Level 1.
  - LVIDKSL — Saves and loads Level 1 programs to disk.
  - DIRCHECK — Tests disk directories for errors and lists them.
  - ASPOOL — An automatic spooler which routes a disk file to the printer whilst the computer continues to operate on other programs.
  - LCDVR — a lower case drives which display lower case on the screen if you have fitted a simple lower case modification.

## DISK DRIVE USERS ELIMINATE CRC ERRORS AND TRACK LOCKED OUT MESSAGES FIT A PERCOM DATA SEPARATOR \$37.00 plus \$1.20 p&p.

When Tandy designed the TRS-80 expansion interface, they did not include a data separator in the disk-controller circuitry, despite the I.C. manufacturer's recommendations to do so. The result is that many disk drive owners suffer a lot of Disk I/O errors. The answer is a data separator. This unit fits inside your expansion interface. It is supplied with full instructions and is a must for the serious disk user.

## MPI DISK DRIVES HIGHER PERFORMANCE — LOWER PRICE

MPI is the second largest manufacturer of disk drives in the world. MPI drives use the same form of head control as 8" drives and consequently, they have the fastest track-to-track access time available — 5msec! All MPI drives are capable of single or double-density operation. Double-density operation requires the installation of a PERCOM doubler board in the expansion interface.

As well as single head drives, MPI also makes dual-head drives. A dual-head drive is almost as versatile as two single-head drives but is much cheaper.

Our MPI drives are supplied bare or in a metal cabinet — set up to operate with your TRS-80 or SYSTEM 80. All drives are sold with a 90 day warranty and service is available through MICRO-80 PRODUCTS.

**MPI B51 40 Track Single Head Drive . . . . . only \$339**  
**MPI B52 40 Track Double Head Drive . . . . . only \$449**

Prices are for bare drives and include p&p. Add \$10.00 per drive for a cabinet and \$60.00 for a power supply to suit two drives. 40 track drives are entirely compatible with 35 track drives. A 40 track DOS such as NEWDOS 80 is necessary to utilise the extra 5 tracks.

## OVER 800 KILOBYTES ON ONE DISKETTE! WITH MPI 80 TRACK DRIVES

MPI 80 track drives are now available. The B91 80 track single-head drive stores 204 Kilobytes of formatted data on one side of a 5½ inch diskette in single-density mode. In double-density mode it stores 408 Kilobytes and loads/saves data twice as quickly.

The B92 80 track dual-head drive stores 204 Kilobytes of formatted data on EACH side of a 5½ inch diskette in single-density mode. That's 408 Kilobytes per diskette. In double-density mode, the B92 stores a mammoth 408 Kilobytes per side or 816 Kilobytes of formatted data per diskette. With two B92's and a PERCOM double, you could have over 1.6 Megabytes of on line storage for your TRS-80 for less than \$1500!!

**MPI B91 80 Track Single Head Drive . . . . . only \$499**  
**MPI B92 80 Track Dual Head Drive . . . . . only \$599**

Prices are for bare drives and include p&p. Add \$10.00 per drive for a cabinet and \$60.00 for a power supply to suit two drives. Note: 80 track drives will not read diskettes written on a 35 or 40 track drive. If drives with different track counts are to be operated on the same system, NEWDOS 80 must be used.

## CARE FOR YOUR DISK DRIVES? THEN USE 3M's DISK DRIVE HEAD CLEANING DISKETTES \$30.20 incl. p&p.

Disk drives are expensive and so are diskettes. As with any magnetic recording device, a disk drive works better and lasts longer if the head is cleaned regularly. In the past, the problem has been, how do you clean the head without pulling the mechanism apart and running the risk of damaging delicate parts. 3M's have come to our rescue with SCOTCH BRAND, non-abrasive, head cleaning diskettes which thoroughly clean the head in seconds. The cleaning action is less abrasive than an ordinary diskette and no residue is left behind. Each kit contains:

- 2 head cleaning diskettes
- 1 bottle of cleaning fluid
- 1 bottle dispenser cap

**MICROPOLIS 77 TRACK DISK DRIVES**

These fabulous MICROPOLIS disk drives have more than double the storage capacity of the standard 35 track drives.

**DD-7S only \$775 incl. p&p**

77 track MICROPOLIS drive complete with cable for four drives, power supply, chassis and includes NEWDOS 80.

**DD-7 only \$649 incl. p&p**

Same as above but no cable or NEWDOS 80.

**DC-4 only \$45 incl. p&p**

4 drive connector cable — suitable for any disk drives.

**FLOPPY DOCTOR AND MEMORY DIAGNOSTIC**

(by MICRO CLINIC) \$29.95 plus 50c. p&p

Two machine language programs on a diskette together with manual which thoroughly test your disk drives and memory. There are 19 possible error messages in the disk drive test and their likely causes are explained in the manual. Each pass of the memory tests checks every address in RAM 520 times, including the space normally occupied by the diagnostic program itself. When an error occurs the address, expected data, and actual data are printed out together with a detailed error analysis showing the failing bit or bits, the corresponding IC's and their location. This is the most thorough test routine available for TRS-80 disk users.

**PROGRAMS BY MICROSOFT****EDITOR ASSEMBLER PLUS (L2/16K)**

\$37.50 + \$1.20 p&p

A much improved editor-assembler and debug/monitor for L2/16K TRS-80 or SYSTEM 80. Assembles directly into memory, supports macros and conditional assembly, includes new commands-substitute, move, copy and extend.

**LEVEL III BASIC \$59.95 plus \$1.20 p&p**

Loads on top of Level II BASIC and gives advanced graphics, automatic renumbering, single stroke instructions (shift-key entries) keyboard debounce, suitable for L2/16K and up (Not Disk BASIC)

**ADVENTURE ON DISK \$35.95 plus \$1.20 p&p**

This is the original ADVENTURE game adapted for the TRS-80. The game fills an entire diskette. Endless variety and challenge as you seek to rise to the level of Grand Master. Until you gain skill, there are whole areas of the cave that you cannot enter. (Requires 32K One Disk)

**BASIC COMPILER \$208 plus \$2.00 p&p**

New improved version, the Basic Compiler converts Disk BASIC programs to machine code, automatically. A compiled program runs, on average, 3-10 times faster than the original BASIC program and is much more difficult to pirate.

**GREEN SCREEN SIMULATOR**

\$19.95 incl. p&p

The GREEN SCREEN SIMULATOR is made from a deep green perspex, cut to fit your monitor. It improves contrast and is much more restful to the eyes than the normal grey and white image.

All editorial staff of MICRO-80 are now using GREEN SCREEN SIMULATORS on their own monitors.

Please make sure to specify whether you have an old (squarish) or new (rounded) style monitor when ordering. Not available for Dick Smith monitors.

**UPGRADE TO 16K FOR ONLY \$30.00!!****MICRO-80's 16K MEMORY EXPANSION KIT HAS BEEN REDUCED IN PRICE EVEN MORE**

Larger volume means we buy better and we pass the savings on to you. These are our proven, prime, branded 200 ns (yes, 200 nanosecond) chips. You will pay much more elsewhere for slow, 350 ns. chips. Ours are guaranteed for 12 months. A pair of DIP shunts is also required to upgrade the CPU memory in the TRS-80 — these cost an additional \$4.00. All kits come complete with full, step-by-step instructions which include labelled photographs. No soldering is required. You do not have to be an experienced electronic technician to instal them.

**USE TANDY PERIPHERALS ON YOUR SYSTEM-80 VIA****SYSPAND-80 — \$119 incl. p&p**

The SYSTEM-80 hardware is not compatible with the TRS-80 in two important areas. The printer port is addressed differently and the expansion bus is entirely different. This means that SYSTEM-80 owners are denied the wealth of economical, high performance peripherals which have been developed for the TRS-80. Until now, that is. MICRO-80 has developed the SYSPAND-80 adaptor to overcome this problem. A completely self-contained unit in a small cabinet which matches the colour scheme of your computer, it connects to the 50-way expansion part on the rear of your SYSTEM 80 and generates the FULL Tandy 40 way bus as well as providing a Centronics parallel printer port. SYSPAND-80 enables you to run an Exatron Stringy Floppy from your SYSTEM 80, or an LNW Research expansion interface or a MICROTEK memory expansion module or any other desirable peripherals designed to interface to the TRS-80 expansion port. Make your SYSTEM 80 hardware compatible with the TRS-80 via SYSPAND-80.

**UPGRADE TO A 48K SYSTEM FOR ONLY \$245!!****VIA THE  
MICROTEK MEMORY EXPANSION/PRINTER  
MODULE**

Need more memory but don't want to pay over \$600 for an expansion interface? Then the MICROTEK MT-32 memory expansion/printer module is for you. Ready to plug in and go, this module provides you with sockets for an extra 32K of ram in 16K blocks plus a printer port. It is housed in an attractive, grey and black metal cabinet of similar size to the Tandy expansion interface so that you can sit your monitor atop it. The MICROTEK unit runs from the same external power pack as the Tandy CPU. The Centronics parallel printer port enables you to run most printers including the Olivetti ET-121 with MICRO-80 interface. Full instructions for connecting to your system and adding memory chips are included.

SYSTEM 80 owners can use the MICROTEK module via the SYSPAND-80 adaptor. A separate external power supply providing 7.5—0—7.5 volt ac at 0.5 amp plus 20v unfiltered dc at 250 ma is required. (not available at present from MICRO-80 PRODUCTS)

<b>MICROTEK MT32-A</b>	<b>OK . . . . .</b>	<b>\$149</b>
<b>MICROTEK MT32-B</b>	<b>16K . . . . .</b>	<b>\$179</b>
<b>MICROTEK MT32-C</b>	<b>32K . . . . .</b>	<b>\$209</b>

**HIGH QUALITY DISKETTES** ALL PRICES INCLUDE P&P

40 TRACK NASHUA SINGLE SIDE/SINGLE DENSITY ... \$45.00 box of 10

40 TRACK VERBATIM DOUBLE SIDE

## SOFTWARE BY AUSTRALIAN AUTHORS

All our software is suitable for either the SYSTEM 80 or the TRS-80

### NEW SOFTWARE FROM MICRO-80 PRODUCTS BUSINESS PROGRAMS

#### MICROMANAGEMENT

##### STOCK RECORDING SYSTEM (L2/16K)

Cassette version. .... \$29.95 + \$1.00 p&p  
Stringy Floppy version. .... \$33.95 + \$1.00 p&p

This system has been in use for 9 months in a number of small retail businesses in Adelaide. It is therefore thoroughly debugged and has been tailor made to suit the requirements of a small business. MICROMANAGEMENT SRC enables you to monitor the current stock level and reorder levels of 500 different stock items per tape or wafer. It includes the following features:-

- Add new items to inventory
- Delete discontinued items from inventory
- List complete file
- Search for any stock number
- Save data to cassette or wafer
- Load data from cassette or wafer
- Adjusts stock levels from sales results and receipt of goods
- List all items requiring reordering

We can thoroughly recommend this program for the small business with a L2/16K computer.

#### SCOTCH BRAND COMPUTING CASSETTES

Super-quality personal computing cassettes.

C-10 pack of 10 ... ... ... \$26.00 incl. p&p  
C-30 pack of 10 ... ... ... \$28.00 incl. p&p

### UTILITIES

#### S-KEY by Edwin Paay \$15.95 plus 50c. p&p

S-KEY is a complete keyboard driver routine for the TRS-80 and becomes part of the Level II basic interpreter. With S-KEY loaded the user will have many new features not available with the standard machine.

##### S-KEY features:

- \* S-KEY provides an auto-repeat for all the keys on the keyboard. If any key is held down longer than about half a second, the key will repeat until it is released.
- \* Graphic symbols can be typed direct from the keyboard, this includes all 64 graphic symbols available from the TRS-80/SYSTEM 80.
- \* S-KEY allows text, BASIC commands and/or graphics to be defined to shifted keys. This makes programming much easier as whole commands and statements can be recalled by typing shift and a letter key.
- \* Because S-KEY allows graphics to be typed directly from the keyboard, animation and fast graphics are easily implemented by typing the appropriate graphics symbols directly into PRINT statements.
- \* S-KEY allows the user to LIST a program with PRINT statements containing graphics, properly. S-KEY does this by intercepting the LIST routine when necessary.
- \* S-KEY allows the user to list an updated list of the shift key entries to the video display or line printer.
- \* S-KEY can be disabled and enabled when required. This allows other routines which take control of the keyboard to run with S-KEY as well.

Each cassette has TRS-80, DISK and SYSTEM 80 versions and comes with comprehensive documentation.

#### BMON by Edwin Paay \$19.95 plus 50c. p&p THE ULTIMATE HIGH MEMORY BASIC MONITOR L2/16-48K

Our own personnel refuse to write BASIC without first loading this amazing machine language utility program into high memory! BMON Renumbers; Displays BASIC programs on the screen while they are still loading; tells you the memory locations of the program just loaded; lets you stop a load part-way through; merges two programs, with automatic renumbering of the second so as to prevent any clashes of line numbers; recovers your program even though you did type NEW: makes one program invisible while you work on a second (saves hours of cassette time!); lists all the variables used in the program; makes SYSTEM tapes; lets you Edit memory directly . . . the list goes on and on. Cassette comes with 16K, 32K and 48K versions, ready to load. Can anyone afford NOT to have BMON?

### EDUCATIONAL

#### RPN CALCULATOR (L2/16K & 32K)

\$24.95 \$ 50c. p&p

Give your computer the power of a \$650 reverse polish notation calculator with 45 functions and selectable accuracy of 8 or 16 digits. The main stack and registers are continuously displayed whilst the menu is always instantly accessible without disturbing any calculations or register values. The cassette comes with both the 16K and 32K versions, the latter giving you the additional power of a programmable calculator. Comes with a very comprehensive 15 page manual, which includes instructions to load and modify the 32K programmable version to run in 16K. Whether for business or pleasure, this package will prove invaluable, and turn you '80 into a very powerful instrument.

### GAMES

#### MICROPOLY (L2/16K)

\$7.50 \$ 50c p&p

Now you can play Monopoly on your micro. The old favourite board game has moved into the electronic era. This computer version displays the board on the screen, obeys all the rules and, best of all, the banker does not make mistakes with your change!

#### CONCENTRATION (L2/16K)

\$7.50 + 50c p&p

Another application of supergraphics. There are 28 "cards" displayed on the screen, face down. Players take it in turn to turn them over with the object of finding matching pairs. There are 40 different patterns which are chosen at random, so the game is full of endless variety. This is of particular value in helping young children to learn the art of concentrating and, at the same time, to introduce them to the computer.

#### METEOR AND TORPEDO ALLEY (L2/16K)

\$9.95 + 50c p&p

Those who frequent games arcades will recognize these two electronic games. In METEOR you must destroy the enemy space ships before they see you. In its most difficult mode, the odds are a thumping 238 to 1 against you being successful. In torpedo alley you must sink the enemy ships without hitting your own supply ship. Both games include sound effects and are remarkably accurate reproductions of the arcade games.

**AUSTRALIAN SOFTWARE (Cont.)****TOUCHTYPE (L2/4K) \$19.95 + 50c. p&p**

An interactive, 22 lesson typing course which uses the computer's keyboard and screen to teach you to type rapidly and accurately and, a massive cassette data dump to control your progress. The computer checks for accuracy, and sets timed exercises to check your progress. If you have to look at each key before you press it, or only use two fingers, then this program, plus a little perserverance, will do some amazing things to your typing speed.

**GAMES****U BOAT \$7.50 plus 50c p&p**

Real time simulation at its best! Comes with working sonar-screen and periscope, a full rack of torpedoes, plenty of targets, working fuel and battery meters, helpful Mothership for high-seas reprovisioning and even has emergency radio for that terrible moment when the depth charges put your crew at risk. Requires Level II/16K.

**SPACE INVADERS \$7.50 plus 50c p&p**

Much improved version of this arcade favourite with redesigned laser and cannon blasts, high-speed cannon, 50 roving drone targets, 10 motherships and heaps of fun for all. Level II with 4K and 16K versions on this cassette.

**GOLF (L2/16K) \$7.50 + 50c p&p**

Pit your skills at mini-golf against the computer. Choose the level of difficulty, the number of holes and whether you want to play straight mini golf or crazy golf. Complete with hazards, water traps, bunkers and trees. Great fun for kids of all ages.

**DOMINOES(L2/16K) \$7.50 + 50c p&p**

Pit your skill at dominoes against the computer, which provides a tireless opponent. Another application of supergraphics from the stable of Charlie Bartlett. Dominoes are shown approximately life size in full detail (except for colour!). The monitor screen is a window which you can move from one end of the string of dominoes to the other. Best of all, you don't lose any pieces between games!

**KID'S STUFF (formerly MMM-1) \$7.50 plus 50c. p&p**

Three games on one cassette from that master of TRS-80 graphics, Charlie Bartlett. Includes INDY 500, an exciting road race that gets faster and faster the longer you play, SUBHUNT in which your warship blows up unfortunate little submarines all over the place, and KNEVEL (as in motorcycle, ramp and buses).

**OTHER PROGRAMS****INFINITE BASIC BY RACET (32K/1 DISK)**

**\$49.95 + 50c. p&p**

Full matrix functions – 30 BASIC commands; 50 more STRING functions as BASIC commands.

**GSF/L2/48K \$24.95 + 50c. p&p**

18 machine language routines including RACET sorts.

**BUSINESS ADDRESS AND INFORMATION SYSTEM (48K/DISK) \$24.95 + 50c. p&p**

Allows you to store addresses and information about businesses, edit them and print them out.

**HISPED (L2 16, 32 or 48K) \$29.95**

This machine language program allows you to SAVE and LOAD programs and data to tape at speeds up to 2000 baud (4 times normal) using a standard cassette recorder. A switch must be installed to remove the XRX III loading board, if fitted.

**PROGRAMS FROM CREATIVE COMPUTING  
ADVENTURE PROGRAMS****ADVENTURELAND (L2/16K) \$14.95 + 50c. p&p**

Try to find and take treasures as you explore a fantasy world. The computer acts as your puppet and carries out your two word commands.

Sometimes you will need special objects to do certain things, often a little magic is necessary. Absorbing and challenging.

**THE COUNT ADVENTURE (L2/16K)**

**\$14.95 + 50c. p&p**

In this adventure, you awaken in a bed in a castle in Transylvania. You don't know why you are there but you'd better solve the puzzle before it's too late. Just as enthralling as ADVENTURELAND but blood thirstier!

**ADVENTURELAND AND PIRATE ADVENTURE ON DISK (32K ONE DISK) \$24.95 + 50c. p&p**

This is the Adventureland program on disk plus Pirate Adventure, complete with buried treasure, keel hauling, planks for walking and skulls and crossbones.

You can save the game to disk at any point and return to it later when your nerves are steady.

**GAMES****AIR TRAFFIC CONTROLLER (L2/16K)**

**\$9.95 + 50c. p&p**

One of the hottest selling games in the USA, you are the Air Traffic Controller and the monitor is your radar screen. Bring down the aircraft safely and avoid mid-air collisions.

**Z CHESS (L2/16K) \$19.95 + 50c. p&p  
(DISK/32K) \$24.95 + 50c. p&p**

Seven levels of ability, contains all standard moves including castling and En Passant captures. It can play either black or white and its versatile board set-up mode allows specific positions to be played as desired.

**SPACE GAMES (L2/16K) \$13.50 + 50c. p&p**

3 Space Games including ULTRA-TREK, ROMULAN,

and STARWARS. Fast, real-time graphics.

**STRATEGY GAMES (L2/16K) \$9.50 + 50c. p&p**

5 Strategy games including TUNNEL VISION (find your way out of a 3-D maze), EVASION – avoid the deadly snake), JIGSAW (put the puzzle together), THE MASTERS (Golf on the '80 for up to 4 players), MOTOR RACING (Compete against the computer at Indy or the Grand Prix).

**GRAPHING PACKAGE (L2/16K) \$9.95 + 50c. p&p**

A set of 6 utility programs which allow you to draw BAR GRAPHS, GRAPH CARTESIAN COORDINATES, carry out POLAR GRAPHING, PARAMETRIC GRAPHING, LINEAR REGRESSION and PARABOLIC REGRESSION.

**BOOKS****LEVEL II ROM REFERENCE MANUAL**

**\$24.95 + \$1.20 p&p**

Over 70 pages packed full of useful information and sample programs. Applies to both TRS-80 and SYSTEM 80.

**TRS-80 DISK AND OTHER MYSTERIES**

**\$24.95 \$1.20 p&p**

The hottest selling TRS-80 book in the U.S.A. Disk file structures revealed, DOS's compared and explained, how to recover lost files, how to rebuild crashed directories – this is a must for the serious Disk user and is a perfect companion to any of the NEWDOS's.

```

60344 NEXT G
60345 P(C,D)= P(A,B)
60346 P(A,B)="" : RETURN
60350 REM =====MOVING QUEENS
60355 IF A>C AND B>D THEN GOSUB 60300 : RETURN
60360 IF A=C OR B=D THEN GOSUB 60200 : RETURN
60365 E=1
60370 RETURN
60400 REM =====MOVING KINGS
60405 IF ABS(A-C)>1 OR ABS(B-D)>1 THEN E=1 : RETURN
60410 IF A>C AND B>D THEN GOSUB 60300 : RETURN
60415 IF A=C OR B=D THEN GOSUB 60200 : RETURN
60420 E=1:RETURN
60450 REM =====MOVING PAWNS
60460 Y=0
60465 IF I=6 AND B=7 AND (B-D)>0 THEN Y=1
60470 IF I=12 AND B=2 AND (D-B)>0 THEN Y=2
60480 L=ABS(B-D)
60485 IF L=2 AND Y<1 THEN E=1:RETURN
60490 IF (B-D)<0 AND I=6 THEN E=1 : RETURN
60495 IF (D-B)<0 AND I=12 THEN E=1 : RETURN
60497 IF J>0 THEN 60550
60498 IF A>C THEN E=1 : RETURN
60500 IF P(C,D)<>"" THEN E=1 : RETURN
60505 IF L=2 AND P(A,D-1)<>"" AND Y=2 THEN E=1 : RETURN
60510 IF L=2 AND P(A,D+1)<>"" AND Y=1 THEN E=1 : RETURN
60515 GOTO 60700
60550 IF ABS(A-C)>1 THEN E=1 : RETURN
60555 IF ABS(B-D)>1 THEN E=1 : RETURN
60560 IF P(C,D)="" THEN E=1: RETURN
60700 IF D=1 OR D=8 THEN P(C,D)=L$(I-2)ELSE P(C,D)=P(A,B)
60710 P(A,B)=""
60720 RETURN
65000 REM HELP BOARD NUMBERING
65005 FOR I= 1TO 8:FOR J= 1 TO8
65007 H$=RIGHT$(STR$(I*10+J),2):H$=LEFT$(H$,1)+", "+RIGHT$(H$,1)
65010 PRINT @ V(I,J)+64,H$;
65020 NEXT J,I
65030 GOTO 540
65050 FOR I=1 TO 8 : FOR J= 1TO 8
65060 PRINT @ V(I,J)+63,S(I,J*2-1);
65070 NEXT J,I: GOTO 540

```

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## CELLAR CONTROL (L2/16K)

BY M.J. LEONARD

This is an inventory control and selection guide for up to 200 different wines with a maximum of 99 bottles of each. Which means it could keep control of a cellar containing 19,800 bottles! (hic! - Ed.). Selection can be made from three fields namely:

- Vintage year
- Vineyard (or Maker)
- Grape Variety or Type

Display of the selected field is given on the VDU, panel by panel. Upon making your choice(s), returning to the menu allows adjustment of the stock and automatic reduction of the inventory. The updated file is then returned to tape. As data is packed, it takes only six and a half minutes to save or load 200 entries.

This program is an interesting exercise in character string manipulation, which could be adapted for cataloguing and control of many other hobbies... records, beer mats, books and plants to name a few. The only care that must be taken is that once headings have been created, all entries to and selection from the individual items, (strings) must be of the specified field length, e.g. number of bottles must always contain 3 digits, otherwise the computer will get lost. Each entry should look like this:-

NO	YEAR	VINEYARD	BIN/TYPE	VARIETY	BGT	PRICE	BIN
003	1965	Rosemount	Bin 25A	Cab.Shiraz	'80	4.25	14

Only the number of bottles and three of the fields (Or headings) are called up in the program, therefore you are free to change or enter anything under the other headings or even add another category such as Bin Number for example, if you want to know which wines are in a particular Bin. Instructions are given throughout the program, "NEWLINE" showing that it was created on a System 80 (TRS-80 users press "ENTER" instead of "NEWLINE").

```

5' CELLAR CONTROL
6' AUTHOR - M. J. LEONARD, 3 PROSPECT AVE., CREMORNE, 2090
10 CLS:CLEAR11500:DEFSTRA:DEFINTI,J,T,X:DIMA(201):PRINT@23,"CELLAR CONTROL":PRIN
T@87,STRING$(14,42):PRINT"FOR CONTROL AND ORGANISATION OF UP TO 200 DIFFERENT WI
NES"
15 PRINT:PRINT"# 1. KEYBOARD INPUT", "# 5. ADJUST STOCK":PRINT
20 PRINT"# 2. CASSETTE INPUT", "# 6. SELECT VINTAGE":PRINT
25 PRINT"# 3. SAVE ON CASSETTE", "# 7. SELECT VARIETY":PRINT
30 PRINT"# 4. CELLAR LIST", "# 8. SELECT VINEYARD":PRINT
35 INPUT"SELECTION #";X$:X=VAL(X$):IFX=00RX>8GOTO35ELSEONXGOTO40,80,135,94,110,1
55,170,180
40 CLS:PRINT"KEYBOARD INPUT":PRINT:PRINT"- ENTRY OF VINTAGE YEAR COMMENCES UNDER
'Y'":PRINT"- ENTRY OF BOTH VINEYARD AND GRAPE VARIETY COMMENCES UNDER 'V' AN
D CONSISTS OF LESS THAN 12 LETTERS":PRINT"- BGT = YEAR PURCHASED; BIN = STORAGE
BIN"
41 PRINT"- NO = NUMBER OF BOTTLES; ENTER THREE DIGITS E.G. 001":PRINT:PRINT"TO
RETURN TO SELECTION, OR CORRECT ERROR, TYPE 'EXIT'"
42 PRINT:PRINT" NO YEAR VINEYARD BIN\TYPE VARIETY BGT PRICE BIN"
43 FORI=1TO200
45 IF(A(I)<>"")THEN70
50 A=""":INPUTA:IFLEN(A)>57THEN65
55 IF(A="EXIT")THENI=I-1:GOTO75
60 GOTO68
65 PRINT"ERROR...ENTRY EXCEEDS MAXIMUM LENGTH":GOTO50
68 A(I)=""+A
70 NEXT
75 CLS:PRINT"END OF INPUT...LIST CONTAINS";I;"WINES":GOTO15
80 CLS:PRINT"INPUT FROM CASSETTE":PRINT
85 INPUT"PREPARE CASSETTE RECORDER...PRESS -NEWLINE- WHEN READY";X$:PRINT:PRINT"
LIST NOW BEING ENTERED FROM TAPE...PLEASE WAIT"
86 FORI=1TO200STEP4
87 INPUT#-1,A(I),A(I+1),A(I+2),A(I+3)
88 IF(A(I)="ORA(I+1)="ORA(I+2)="ORA(I+3)=")THEN90
89 NEXTI
90 CLS:PRINT"INPUT FROM CASSETTE COMPLETED":GOTO15
94 CLS:PRINT"COUNTING STOCK...PLEASE WAIT"
95 V=0:FORI=1TO200:V=V+VAL(MID$(A(I),2,3)):NEXTI:CLS:PRINT"CELLAR LIST",,"TOTAL
STOCK";V;"BOTTLES"
98 FORI=1TO200
99 PRINTI:PRINTA(I):PRINT:IF(A(I)=")THEN105
100 IFINT(I/7)=I/7THENPRINT"PRESS -NEWLINE- FOR NEXT PANEL":INPUTX$:PRINT
101 NEXTI
105 PRINT"CELLAR LIST COMPLETE":INPUT"PRESS -NEWLINE- TO RETURN TO SELECTION";X:
CLS:GOTO15
110 CLS:PRINT"STOCK ADJUSTMENT":PRINT:PRINT"NIL STOCK AUTOMATICALLY REMOVES WINE
FROM LIST":PRINT:INPUT"WHICH LINE NO. IS REQUIRED";I
112 PRINT:PRINT"LINE TO BE ADJUSTED :-":PRINTA(I):PRINT:INPUT"What IS ADJUSTMENT
";J:IFJ>99THEN112
115 JI=VAL(MID$(A(I),3))+J
120 IFJI=0THEN130
121 IFJI>9THEN125
124 A(I)=""+STR$(JI)+MID$(A(I),4,54):CLS:GOTO15
125 A(I)=""+STR$(JI)+MID$(A(I),4,54):CLS:GOTO15
130 FORI=1TO200
131 A(I)=A(I+1)
132 NEXTI
133 CLS:GOTO15
135 CLS:PRINT"SAVING ON CASSETTE":PRINT:INPUT"PREPARE CASSETTE RECORDER...PRESS
-NEWLINE- WHEN READY";X:PRINT:PRINT"LIST NOW BEING RECORDED ON TAPE...PLEASE WAI
T"
140 FORI=1TO200STEP4
142 PRINT#-1,A(I),A(I+1),A(I+2),A(I+3)
145 IF(A(I)="ORA(I+1)="ORA(I+2)="ORA(I+3)=")THEN150
147 NEXTI

```

```
150 CLS:PRINT"RECORDING COMPLETED":GOTO155
155 CLS:PRINT"SELECT VINTAGE":PRINT:INPUT"TOTAL NO. OF WINES LISTED";II:PRINT
156 INPUT"WHAT VINTAGE IS REQUIRED";X:IFX<19000ORX>2000THEN156
159 FORI=1TOII
160 J=VAL(MID$(A(I),7,4)):IFX=JTHEN165
162 GOTO166
165 PRINTI,:PRINTA(I):C=C+1:IFINT(C/15)=C/15THENPRINT"PRESS -NEWLINE- FOR NEXT P
ANEL";:INPUTX$  
166 NEXTI
168 PRINT"LIST COMPLETE":PRINT"PRESS -NEWLINE- TO RETURN TO SELECTION"::INPUTX$:  
CLS:GOTO155
170 CLS:PRINT"SELECT VARIETY":PRINT:INPUT"TOTAL NO. OF WINES LISTED";II:PRINT
171 INPUT"WHAT GRAPE VARIETY IS REQUIRED (11 SPACES)":G$:IFLEN(G$)<>11THENPRINT:  
PRINT"ERROR...SELECTION MUST CONSIST OF 11 LETTERS AND/OR SPACES":PRINT:GOTO171
174 FORI=1TOII
175 S$=MID$(A(I),34,11):IFG$=S$THEN165
176 GOTO166
180 CLS:PRINT"SELECT VINEYARD":PRINT:INPUT"TOTAL NO. OF WINES LISTED";II:PRINT
181 INPUT"WHAT VINEYARD IS REQUIRED (11 SPACES)":Y$:IFLEN(Y$)<>11THENPRINT:PRINT:  
"ERROR...SELECTION MUST CONSIST OF 11 LETTERS AND/OR SPACES":PRINT:GOTO181
184 FORI=1TOII
185 T$=MID$(A(I),12,11):IFY$=T$THEN165
186 GOTO166
```

\*\*\*LIFE AT 7000H\*\*\*LIFE AT 7000H\*\*\*LIFE AT 7000H\*\*\*LIFE AT 7000H\*  
ADAPTED BY N. ROSSITER BASIC and m/l (L2/1K)

Yes it is, your eyes don't deceive you. After waiting twelve months for someone to relocate Life to run at 7000H we eventually received it. If you still have the original BASIC part of the program on tape there is a small change that you will have to edit into it. If you are typing in the listing from the magazine (or you have a cassette subscription) you will not need to worry as the changes have been made for you. System 80/Video Genie/PMC 80 owners should type in the BASIC listing from this month's magazine and not the listing in the January 1980 issue as the 1980 version will not work on your machines. For those that were not subscribers at the time, the original text (changed where necessary) is reproduced below.

This program is in two parts, a machine language sub-routine which carries out most of the computations and a BASIC program used to set up initial parameters. The BASIC program calls the machine language program via the USR command.

The machine language program should be entered first using either an editor/assembler or a suitable monitor such as T-BUG (BMON is not suitable because it resides in the same area of memory as this program. You could use BMON by locating the program at a lower position in memory and adding a block-move routine as described in Issue 10, (September 1980). Note, however, that you would need to make the block-move routine pass control back to BASIC (at 6CCH) as soon as it has moved the program, rather than transfer control to the machine language program itself). Those using an editor/assembler to enter the program should ignore the first two columns in the listing and start with column 3, which contains the line numbers. For those using a monitor, the machine language program is shown in the two columns down the left-hand side of the listing. The first column contains the address and the second the actual program material in Hex. Select EDIT or CHANGE MEMORY mode in your monitor starting at 7C00H, enter 21. The monitor will automatically move on to 7C01H. You should then enter 95. At 7C02H enter 77, at 7C03H enter 22 and so on until you reach 77EFH, which you should leave unaltered and exit the EDIT mode. Note that the addresses 3C00H, 3C1FH and 3C56H , which are in screen RAM, are also shown in the listing as being altered. These addresses are used by the machine language program to print messages directly on to the screen whilst the program is loading. If you enter the program with a monitor rather than an editor/assembler, this facility will not be available to you and you will need to be content with using the normal method of loading machine language programs.

Once you have entered the machine language program, punch out a SYSTEM tape. If you have used an editor/assembler, the necessary parameters will be automatically provided on the tape. If you have entered the program via a monitor, punch the tape using the following parameters:-

START=766BH END=7CFEH ENTRY=7795H

Now, enter the BASIC listing and CSAVE it.

When reloading LIFE from tape first protect Memory size at 30314 then:-

- 1) Type "SYSTEM"
- 2) Press ( ENTER/NEWLINE )
- 3) ANSWER "\*?" with "LIFE". Press (ENTER/NEWLINE)
- 4) When the second "\* ?" appears, answer with "/"
- 5) A message will then appear on the screen explaining the changes you need to make to the original BASIC program. If you are using the original BASIC listing, make these changes. If you have entered the listing from this issue, ignore the message.
- 6) CLOAD in the BASIC program and type RUN.

The game of LIFE was originally discussed in the Scientific American some years ago. It isn't really a game at all, but a rather complex set of rules governing the growth of cells (or civilisations), which this program illustrates graphically on the 80's screen.

The rules are as follows:-

- 1) Each cell (2X by 1Y in this version) is capable of life
- 2) Life will be created in a cell location if it has exactly three living neighbours.
- 3) Life will continue if a cell has only two or three living neighbours.
- 4) Life will cease if a cell has less than two living neighbours (we all need some companionship).
- 5) Life will cease if a cell has more than three living neighbours (since three cells are required to create life it stands to reason that "four's a crowd" therefore five is unlivable).
- 6) All births and deaths must occur simultaneously.

This version of LIFE is in two parts. The BASIC program is quite self explanatory, offering the option of user or computer generated starting patterns, variable generation speeds (up to one per second) and single key termination at any time. The machine language routine does all the real work, making massive use of subroutines. Each run through the routine will create one new generation. The original concept of life was that the overall population would enjoy periods of growth and expansion, suffer periods of recession and contraction and that in all cases would stabilise - with either a pattern of growth and contraction that repeats continuously or with a stable and non-changing pattern.

This has always proved to be the case !

766B	00100	BOTTOM	EQU	766BH
77EE	00110	WORKA	EQU	BOTTOM+183H
7800	00120	STORE1	EQU	BOTTOM+195H
7C00	00130	STORE2	EQU	BOTTOM+595H
3C00	00140		ORG	3C00H
3C00 2A	00150		DEFM	' **** LOADING LIFE S/R ** WAIT F'
3C1F 4F	00160		DEFM	' OR "GOOD LOAD" THEN ENTER "/"**'
7C00	00170		ORG	STORE2
7C00 219577	00180		LD	HL,ENTER
7C03 228E40	00190		LD	(408EH),HL
7C06 21003C	00200		LD	HL,3C00H
7C09 01FF03	00210		LD	BC,3FFH
7C0C 11013C	00220		LD	DE,3C01H
7C0F 3620	00230		LD	(HL),20H
7C11 EDB0	00240		LDIR	
7C13 21217C	00250		LD	HL,TEXT
7C16 11003C	00260		LD	DE,3C00H
7C19 01DD00	00270		LD	BC,0DDH
7C1C EDB0	00280		LDIR	
7C1E C3191A	00290		JP	1A19H
7C21 4C	00300	TEXT	DEFM	' LOAD OR ENTER SEEDING PROGRAM.'
7C3F 20	00310		DEFM	' ENTRY POINT FOR USR(0) ROUTIN'
7C5D 45	00320		DEFM	' E HAS BEEN STORED. POKE STAT'
7C7B 45	00330		DEFM	'EMENTS SHOULD BE REMOVED FROM '
7C99 4C	00340		DEFM	'LINE 10 OF MICRO-80 PROGRAM, B'
7CB7 55	00350		DEFM	'UT DO NOT DELETE LINE OR UL ER'

```

7C05 52      00360    DEFM   ' ROR WILL      ARISE AT LINE 210.'
7CF3 20      00370    DEFM   ' GOOD LUCK!'
766B          00380    ORG    BOTTOM
766B 21003C  00390    START   LD     HL,3C00H
766E 110078  00400    LD     DE,STORE1
7671 010004  00410    LD     BC,400H
7674 EDB0     00420    LDIR
7676 210078  00430    LD     HL,STORE1
7679 22EE77  00440    LD     (WORKA),HL
767C 23      00450    INC    HL
767D 22F077  00460    LD     (WORKA+2),HL
7680 23      00470    INC    HL
7681 22F277  00480    LD     (WORKA+4),HL
7684 214078  00490    LD     HL,STORE1+64
7687 22F477  00500    LD     (WORKA+6),HL
768A 23      00510    INC    HL
768B 22F677  00520    LD     (WORKA+8),HL
768E 23      00530    INC    HL
768F 22F877  00540    LD     (WORKA+10),HL
7692 218078  00550    LD     HL,STORE1+128
7695 22FA77  00560    LD     (WORKA+12),HL
7698 23      00570    INC    HL
7699 22FC77  00580    LD     (WORKA+14),HL
769C 23      00590    INC    HL
769D 22FE77  00600    LD     (WORKA+16),HL
76A0 21007C  00610    LD     HL,STORE2
76A3 01FF03  00620    LD     BC,3FFH
76A6 11017C  00630    LD     DE,STORE2+1
76A9 3680     00640    LD     (HL),80H
76AB EDB0     00650    LDIR
76AD 21417C  00660    LD     HL,STORE2+65
76B0 017E03  00670    LD     BC,37EH
76B3 3E00     00680    LD     A,0
76B5 C9      00690    RET
76B6 CB46     00700    TEST0   BIT    0,(HL)
76B8 C8      00710    RET    Z
76B9 3C      00720    INC    A
76BA C9      00730    RET
76BB CB56     00740    TEST2   BIT    2,(HL)
76BD C9      00750    RET    Z
76BE 3C      00750    INC    A
76BF C9      00770    RET
76C0 CB66     00780    TEST4   BIT    4,(HL)
76C2 C8      00790    RET    Z
76C3 3C      00800    INC    A
76C4 C9      00810    RET
76C5 2AEE77  00820    HIRO   LD     HL,(WORKA)
76C8 CDC076  00830    CALL   TEST4
76CB 2AF077  00840    LD     HL,(WORKA+2)
76CE CDC076  00850    CALL   TEST4
76D1 2AF277  00860    LD     HL,(WORKA+4)
76D4 CDC076  00870    CALL   TEST4
76D7 C9      00880    RET
76D8 2AFA77  00890    LORO   LD     HL,(WORKA+12)
76DB CDB676  00900    CALL   TEST0
76DE 2AFC77  00910    LD     HL,(WORKA+14)
76E1 CDB676  00920    CALL   TEST0
76E4 2AFE77  00930    LD     HL,(WORKA+16)
76E7 CDB676  00940    CALL   TEST0
76EA C9      00950    RET
76EB 2AF477  00960    LSIDE  LD     HL,(WORKA+6)
76EE CDBB76  00970    CALL   TEST2
76F1 C9      00980    RET
76F2 2AF877  00990    RSIDE  LD     HL,(WORKA+10)
76F5 CDBB76  01000    CALL   TEST2
76F8 C9      01010    RET
76F9 3E00     01020    HISCAN LD     A,0
76FB CDC576  01030    CALL   HIRO
76FE CDEB76  01040    CALL   LSIDE
7701 CDB676  01050    CALL   TEST0
7704 2AF677  01060    LD     HL,(WORKA+8)
7707 CDBB76  01070    CALL   TEST2
770A CDF276  01080    CALL   RSIDE
770D CDB676  01090    CALL   TEST0

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```

7710 C9      01100    RET
7711 3E00    01110  CSCAN LD A,0
7713 CDEB76  01120    CALL LSIDE
7716 CDB676  01130    CALL TEST0
7719 CDC076  01140    CALL TEST4
771C 2AF677  01150    LD HL,(WORKA+8)
771F CDB676  01160    CALL TEST0
7722 CDC076  01170    CALL TEST4
7725 CDF276  01180    CALL RSIDE
7728 CDB676  01190    CALL TEST0
772B CDC076  01200    CALL TEST4
772E C9      01210    RET
772F 3E00    01220  LOSCAN LD A,0
7731 CDEB76  01230    CALL LSIDE
7734 CDC076  01240    CALL TEST4
7737 CDD976  01250    CALL LORO
773A CDF276  01260    CALL RSIDE
773D CDC076  01270    CALL TEST4
7740 2AF677  01280    LD HL,(WORKA+8)
7743 CDB676  01290    CALL TEST2
7746 C9      01300    RET
7747 D9      01310  STAGE1 EXX
7748 CDF976  01320    CALL HISCAN
774B 3D      01330    DEC A
774C 3D      01340    DEC A
774D 200F    01350    JR NZ,BIT31
774F 2AF677  01360    LD HL,(WORKA+8)
7752 CB46    01370    BIT 0,(HL)
7754 280B    01380    JR Z,STAGE2
7756 D9      01390  SET1 EXX
7757 CBC6    01400    SET 0,(HL)
7759 CBCE    01410    SET 1,(HL)
775B D9      01420    EXX
775C 1803    01430    JR STAGE2
775E 3D      01440  BIT31 DEC A
775F 28F5    01450    JR Z,SET1
7761 CD1177  01460  STAGE2 CALL CSCAN
7764 3D      01470    DEC A
7765 3D      01480    DEC A
7766 200F    01490    JR NZ,BIT32
7768 2AF677  01500    LD HL,(WORKA+8)
776B CB56    01510    BIT 2,(HL)
776D 280B    01520    JR Z,STAGE3
776F D9      01530  SET2 EXX
7770 CBD6    01540    SET 2,(HL)
7772 CBDE    01550    SET 3,(HL)
7774 D9      01560    EXX
7775 1803    01570    JR STAGE3
7777 3D      01580  BIT32 DEC A
7778 28F5    01590    JR Z,SET2
777A CD2F77  01600  STAGE3 CALL LOSCAN
777D 3D      01610    DEC A
777E 3D      01620    DEC A
777F 200F    01630    JR NZ,BIT33
7781 2AF677  01640    LD HL,(WORKA+8)
7784 CB66    01650    BIT 4,(HL)
7786 280B    01660    JR Z,BACK
7788 D9      01670  SET3 EXX
7789 CB66    01680    SET 4,(HL)
778B CBEE    01690    SET 5,(HL)
778D D9      01700    EXX
778E 1803    01710    JR BACK
7790 3D      01720  BIT33 DEC A
7791 28F5    01730    JR Z,SET3
7793 D9      01740  BACK EXX
7794 C9      01750    RET
7795 CD6B76  01760  ENTER CALL START
7798 CD4777  01770  AGAIN CALL STAGE1
779B D9      01780    EXX
779C 2AE677  01790    LD HL,(WORKA)
779F 23      01800    INC HL
77A0 22EE77  01810    LD (WORKA),HL
77A3 2AF077  01820    LD HL,(WORKA+2)
77A6 23      01830    INC HL

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77A7 22F077	01840	LD	(WORKA+2), HL
77AA 2AF277	01850	LD	HL, (WORKA+4)
77AD 23	01860	INC	HL
77AE 22F277	01870	LD	(WORKA+4), HL
77B1 2AF477	01880	LD	HL, (WORKA+6)
77B4 23	01890	INC	HL
77B5 22F477	01900	LD	(WORKA+6), HL
77B8 2AF677	01910	LD	HL, (WORKA+8)
77BB 23	01920	INC	HL
77BC 22F677	01930	LD	(WORKA+8), HL
77BF 2AF877	01940	LD	HL, (WORKA+10)
77C2 23	01950	INC	HL
77C3 22F877	01960	LD	(WORKA+10), HL
77C6 2AF977	01970	LD	HL, (WORKA+12)
77C9 23	01980	INC	HL
77CA 22F977	01990	LD	(WORKA+12), HL
77CD 2AFC77	02000	LD	HL, (WORKA+14)
77D0 23	02010	INC	HL
77D1 22FC77	02020	LD	(WORKA+14), HL
77D4 2AFE77	02030	LD	HL, (WORKA+16)
77D7 23	02040	INC	HL
77D8 22FE77	02050	LD	(WORKA+16), HL
77DB D9	02060	EXX	
77DC 23	02070	INC	HL
77DD 0B	02080	DEC	BC
77DE 78	02090	LD	A, B
77DF B1	02100	OR	C
77E0 20B6	02110	JR	NZ, AGAIN
77E2 21007C	02120	LD	HL, STORE2
77E5 11003C	02130	LD	DE, 3C00H
77E8 010004	02140	LD	BC, 400H
77EB EDB0	02150	LDIR	
77ED C9	02160	RET	
3C56	02170	ORG	3C56H
3C56 2A	02180	DEFM	' ***** GOOD LOAD *****'
7C00	02190	END	STORE2
00000 TOTAL ERRORS			

AGAIN	7798 01770	02110
BACK	7793 01740	01660 01710
BIT31	775E 01440	01350
BIT32	7777 01580	01490
BIT33	7790 01720	01630
BOTTOM	766B 00100	00110 00120 00130 00380
CSCAN	7711 01110	01460
ENTER	7795 01760	00180
HIRO	76C5 00820	01030
HISCAN	76F9 01020	01320
LORO	76D8 00890	01250
LOSCAN	772F 01220	01600
LSIDE	76EB 00960	01040 01120 01230
RSIDE	76F2 00990	01080 01180 01260
SET1	7756 01390	01450
SET2	776F 01530	01590
SET3	7788 01670	01730
STAGE1	7747 01310	01770
STAGE2	7761 01460	01380 01430
STAGE3	777A 01600	01520 01570
START	766B 00390	01760
STORE1	7800 00120	00400 00430 00490 00550
STORE2	7C00 00130	00170 00610 00630 00660 02120 02190
TEST0	76B6 00700	00900 00920 00940 01050 01090 01130 01160 01190
TEST2	76BB 00740	00970 01000 01070 01290
TEST4	76C0 00780	00830 00850 00870 01140 01170 01200 01240 01270
TEXT	7C21 00300	00250
WORKA	77EE 00110	00440 00460 00480 00500 00520 00540 00560 00580 00600 00820 00840 00860 00890 00910 00930 00960 00990 01060 01150 01280 01360 01500 01640 01790 01810 01820 01840 01850 01870 01880 01900 01910 01930 01940 01960 01970 01990 02000 02020 02030 02050

```

2 GAME OF LIFE - BASIC LISTING
5 CLS:INPUT"OPERATING SPEED (0) FAST (9) SLOW";Q:Q=Q*250
10 REMEMBER THIS WAS THE POKE LINE
20 CLS:PRINT"INITIAL PATTERN BY (O)OPERATOR OR (C)OMPUTER?":D$=INKEY$:D$=" "
30 D$=INKEY$:IFD$=" "THEN30ELSEIFD$="0"THEN50ELSEIFD$="C"THEN40ELSE30
40 FORX=46TO68STEP2:FORY=15TO24:Z=RND(03):IFZ<>3THENNEXT:NEXT:GOTO200:ELSESET(X,
Y):SET(X+1,Y):SET(127-X,Y):SET(126-X,Y):SET(X,47-Y):SET(X+1,47-Y):SET(127-X,47-Y
):SET(126-X,47-Y):NEXT:NEXT:GOTO200
50 CLS:PRINT"CONTROL THE CELLS WITH THE FOLLOWING KEYS---"
      TRS-80 : SYSTEM-80
MOVE UP      UP ARROW      ESC
MOVE DOWN    DOWN ARROW    CONTROL
MOVE LEFT    <             <
MOVE RIGHT   >            >""
51 PRINT"REPEAT      S      S
EXECUTE      ENTER      NEWLINE":D$=INKEY$:D$=" "
55 D$=" ":D$=INKEY$:IFD$=" "THEN55ELSECLS
60 D$=" ":D$=INKEY$:RESET(X,Y):RESET(X+1,Y):IFD$=" "THEN150ELSEIFD$="S"THEN190ELSE
Z=ASC(D$)
70 IFZ=91THENY=Y-1:IFY<0THENY=0:GOTO150
80 IFZ=10THENY=Y+1:IFY>47THENY=47:GOTO150
90 IFZ=46THENX=X+2:IFX>127THENX=127:GOTO150
100 IFZ=44THENX=X-2:IFX<0THENX=0:GOTO150
110 IFZ=13THENGOTO210
150 SET(X,Y):SET(X+1,Y):GOTO60
190 SET(X,Y):SET(X+1,Y):GOTO70
200 PRINT@0,"ANY KEY WILL TERMINATE RUN."           :FORT=0TO2000:NEXT
:PRINT@0," ";:PRINTCHR$(28);:PRINTCHR$(30);
210 X=USR(0):D$=" ":D$=INKEY$:IFD$<>" "THEN10ELSEFORK=0TOQ:NEXT:GOTO210

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## TENNIS (L2/4K m/l)

by J. PINAKIS

This program is an assembly language simulation of the popular video tennis game. It was originally written to demonstrate how many of the LEVEL II ROM routines can be used in a program to simplify development. Since the program was written with user modification in mind, as many comments as possible have been included. Due to buffer restrictions in the EDITOR/ASSEMBLER, many of the more recent sections of the program are uncommented but these will be explained later.

## LOADING

The program will load into a Level II '80 with 4K or more memory. Using a suitable monitor or the editor/assembler, load in the Hex or source code. BMON is quite suitable for entering this program as it resides in a different memory location from the program itself. The machine language listing occupies the two left-hand columns in the main listing whilst the source code for an editor/assembler starts with the line numbers in column 3.

If you are using a monitor, enter the EDIT or CHANGE MEMORY mode at 4A00H. Change this location to CD. The monitor will automatically advance to location 4A01. Enter C9. At 4A02 enter 01, at 4A03 enter CD and so on until you reach 4C7B which you should leave unchanged and exit the EDIT mode. Now, punch a SYSTEM tape using the following parameters:-

START=4A00H END=4C7AH ENTRY=4A00H NAME TENNIS

To load the program from tape:-

- 1) Type SYSTEM. Press the ENTER or NEWLINE key
- 2) The computer will respond with \*?
- 3) Type TENNIS. Press the ENTER or NEWLINE key
- 4) The program will then begin to load. When it has loaded the computer will return with \*?
- 5) Type / . Press the ENTER or NEWLINE key and the program will begin to run.

**USE**

Use of the tennis simulation is simple. After the "/" is typed in and ENTER/NEWLINE is pressed, the program will commence by drawing a line down the centre of the screen along with some other information. This line represents the boundary of the tennis court. The game is played to the left of this line and scores are recorded to its right together with any necessary questions. In the playing area, you will see a short line which lies just to the left of the main boundary. This is your bat and can be moved up or down by simply depressing the appropriate key:-

TRS-80	SYSTEM 80	DIRECTION
UP ARROW	ESC	Move bat up
DOWN ARROW	CONTROL	Move bat down

Hold the key down until the bat reaches the desired position. The ball, (which appears as a single white dot) will begin at a random point on the extreme left of the playing area and will bounce up or down until it either reaches the end of the playing area or it hits the bat. If it hits the bat, it bounces off and one is added to the "HIT" score which is displayed on the right hand side of the boundary. If it reaches the end of the playing area, one is added to the "MISS" score and a new ball is served from a random location on the extreme left of the screen. Note that there is a short delay between missing a ball and another one being served and that during this delay the bat cannot be moved.

**SCORING**

You are allowed to miss twenty five balls before the "GAME OVER" message is displayed. Your score is then the value which is displayed alongside the "HIT" message. Once the game is over, you are asked to press either "ENTER" or "BREAK". If you press ENTER (or NEWLINE) the game will begin again and if you press BREAK the computer is returned to the READY mode in BASIC.

**PROGRAM DETAILS**

Tennis loads into memory from 4A00H to 4C7AH with an entry address of 4A00H. Most of the program has been commented. The uncommented sections will be explained here.

The first of these is MESGES which is called during programme initialization. This displays messages MES1 to MES3 by setting up the HL and DE register pairs and calling a general purpose output routine.

Next there is OVER which is jumped to by INCMIS after all 25 balls have been used. Upon entry, it POPS the return address off the stack which was placed there when the INCMIS routine is called by the SERVE routine. It then displays messages MES4 to MES8 in much the same way as MESGES does. The general purpose routine which is used by both MESGES and OVER is DISP. This prints the message pointed to by HL at the screen position in DE. This is accomplished by loading the cursor address (4020H) with the desired location and then using a ROM routine to output the message. Note that the message to be output must be terminated by a zero byte.

The INPT routine simply waits until either the ENTER/NEWLINE key or BREAK key is pressed and then jumps to either INIT or reenters into BASIC at 6CCH respectively.

**VARIABLE TABLE**

These are the memory locations which are used to store certain values during program execution.

XCOOR	This is the X coordinate of the ball
YCOOR	This is the Y coordinate of the ball
XINC	This is the value which is added to the X coordinate each time the ball moves.
YINC	This is the value which is added to the Y coordinate each time the ball moves.
BATLOC	This location contains the bat's address in memory.
HIT	This is the number of times that the ball has been hit.
MISS	This is the number of times that the ball has been missed.

As all the important values are stored in these locations, none of the Z-80 registers are used to store any values. This means that the user can use these registers with no fear of upsetting any values.

## USER MODIFICATION

As mentioned previously, this program was written in such a way that it is able to be easily modified by the user. These are some tips and some more things you should know if you do wish to modify the program. The simplest of user modifications is the adjustment of game speed. If you think that the game is too fast or too slow, then you can simply adjust the value that is loaded into the BC register pair immediatly on entry to the DELAY subroutine. To make the game slower, this value should be increased (try steps of about 300). To make the game faster this value should be decreased but not to less than about 700. Perhaps the more enterprising reader could write a routine which allows the player to choose between a number of set speeds, from the keyboard. Another simple modification is the ball angle. To adjust this, simply adjust the values in (XINC) and (YINC). The YINC value can be changed to any number but care should be taken in adjusting the XINC value for if it is wrongly adjusted the ball may pass straight through the bat. Again, the more advanced user might care to write a routine which sets the ball angle randomly or asks the player for a choice of high or low angles. While on the subject of random numbers. The reader is reminded that the subroutine GETRND will generate a random number between one and the value stored in the HL register pair and places the result in DE.

Note that to use this routine in another program, the short routine INITRM must also be entered and run at some early stage in the user's program. This is because the random number generator needs the locations from 4090H to 4092H to be initialized because this contains the multiplicative mantissa constant used in the random number generator (well you wanted to know!). Perhaps this program could even be the basis for a larger two player game. YOUR SERVE !!!

```

00100 ;TENNIS SIMULATION
00110 ;JAMES PINAKIS
00120 ;3 RIVERVIEW COURT,
00130 ;DALKEITH WA 6009.

4A00      00140    ORG    4A00H
4A00 CDC901 00150    INIT   CALL    1C9H    ;CLEAR SCREEN
4A03 CD534B 00160    CALL    MESGES ;DISPLAY MES1 & MES2
4A06 AF      00170    XOR    A
4A07 32104C 00180    LD     (XCOOR),A .
4A0A 32114C 00190    LD     (YCOOR),A
4A0D 32164C 00200    LD     (HIT),A
4A10 32174C 00210    LD     (MISS),A
4A13 21203C 00220    LD     HL,3C00H+32 ;BAT LOCATION
4A16 22144C 00230    LD     (BATLOC),HL ;SAVE
4A19 3EAA    00240    LD     A,0AAH ;BAT CHARACTER
4A1B ??    00250    LD     (HL),A ;DISPLAY BAT
4A1C CD444B 00260    CALL    BORDER ;DRAW LINE DOWN SCREEN
00270 ; INITIALIZE RAM FOR RND FUNCTION
4A1F 118040 00280    INITRM LD     DE,4080H
4A22 21F718 00290    LD     HL,18F7H
4A25 012700 00300    LD     BC,39
4A28 EDB0    00310    LDIR
4A2A CD274B 00320    INIT1  CALL    RANDOM ;RANDOM START LOCATION FOR BALL.
00330 ; ACTUAL PROGRAM STARTS HERE.
4A2D CD6C4A 00340    LOOP   CALL    SET    ;SET BALL LOCATION
4A30 CD834A 00350    CALL    .    DELAY ;WAIT AWHILE
4A33 CDB24A 00360    CALL    KBOARD ;TEST FOR BAT MOVEMENT
4A36 CD714A 00370    CALL    RESET ;RESET BALL LOCATION
00380 ; INCX INCREMENTS THE X COORDINATE OF THE BALL BY THE
00390 ; VALUE (XINC)
4A39 21124C 00400    INCX   LD     HL,XINC ;X INCREMENT LOCATION
4A3C 3A104C 00410    LD     A,(XCOOR) ;PUT X COOR. IN A
4A3F 86      00420    ADD    A,(HL) ;ADD TO X COORDINATE
00430 ; TESTX TESTS THE X COORDINATE TO SEE IF IT IS TOO LARGE
00440 ; OR TOO SMALL.
4A40 FE4B    00450    TESTX  CP     75    ;END OF COURT?
4A42 F21B4B 00460    JP     P,SERVE ;YES. SERVE NEW BALL
4A45 FE00    00470    CP     0     ;HITTING WALL?
4A47 FABF4B 00480    JP     M,FIXX1 ;YES. BOUNCE BALL
4A4A 32104C 00490    SAVX   LD     (XCOOR),A ;X COOR. OK SO SAVE IT
00500 ; INCY INCREMENTS THE Y COORDINATE BY THE VALUE (YINC)
4A4D 21134C 00510    INCY   LD     HL,YINC ;Y INCREMENT LOCATION
4A50 3A114C 00520    LD     A,(YCOOR) ;Y COOR. TO A
4A53 86      00530    ADD    A,(HL) ;ADD Y COOR TO A
00540 ; TESTY TESTS THE Y COORDINATE TO SEE IF IT IS TOO LARGE
00550 ; OR TOO SMALL.
4A54 FE2F    00560    TESTY  CP     47    ;BOTTOM WALL?
4A56 F29D4A 00570    JP     P,FIXY ;YES SO BOUNCE.
4A59 FE00    00580    CP     0     ;TOP WALL?
4A5B FA9D4A 00590    JP     M,FIXY ;YES SO BOUNCE.
4A5E 32114C 00600    SAVY   LD     (YCOOR),A ;Y COOR. OK SO SAVE IT.
4A61 CD044B 00610    CONT   CALL    TEST   ;SEE IF THE BALL HIT THE BAT
4A64 C32D4A 00620    JP     LOOP   ;DO IT ALL AGAIN

```

00630 ; SUBROUTINES CALLED BY MAIN ROUTINE BEGIN HERE.

00640 ; THIS SUBROUTINE PERFORMS SET, RESET OR POINT

4A67 3E00 00650 POINT LD A,00H ;LOAD FLAG WITH VALUE FOR POINT

4A69 C3734A 00660 JP GRAFIX ;JUMP TO MAIN ROUTINE

4A6C 3E80 00670 SET LD A,00H ;LOAD FLAG WITH VALUE FOR SET

4A6E C3734A 00680 JP GRAFIX ;JUMP TO MAIN ROUTINE

4A71 3E01 00690 RESET LD A,01H ;LOAD FLAG WITH VALUE FOR RESET

4A73 67 00700 GRAFIX LD H,A ;SAVE FLAG

4A74 3A104C 00710 LD A,(XCOOR) ;GET X COOR.

4A77 47 00720 LD B,A ;SAVE X COOR.

4A78 3A114C 00730 LD A,(YCOOR) ;GET Y COOR.

4A7B E5 00740 PUSH HL ;SAVE FLAG TO STACK

4A7C C5 00750 PUSH BC ;SAVE X COOR.

4A7D 218C18 00760 LD HL,188CH ;POINT TO DUMMY STRING

4A80 C35001 00770 JP 150H ;TO GRAPHICS ROUTINE

00780 ; DELAY SIMPLY EXECUTES A SHORT PAUSE AND THEN RETURNS.

4A83 01D007 00790 DELAY LD BC,2000 ;TO MAKE GAME SLOWER INCREASE  
00800 ; THIS VALUE

4A86 CD6000 00810 CALL 60H

4A89 C9 00820 RET

00830 ; FIXX WILL SUBTRACT THE X INCREMENT FROM THE X COOR.  
00840 ; AND NEGATES THE X INCREMENT SO THAT THE BALL BOUNCES.

4A8A 3A104C 00850 FIXX LD A,(XCOOR) ;GET X COORDINATE

4A8D 21124C 00860 LD HL,XINC ;GET LOCATION OF X INCREMENT

4A90 96 00870 SUB (HL) ;SUBTRACT THE X INCREMENT FROM  
00880 ; THE X COORDINATE.

4A91 32104C 00890 LD (XCOOR),A ;SAVE IT.

4A94 3A124C 00900 LD A,(XINC) ;GET X INCREMENT

4A97 ED44 00910 NEG ;NEGATE IT.

4A99 32124C 00920 LD (XINC),A ;PUT IT BACK.

4A9C C9 00930 RET

00940 ; FIXY DOES THE SAME TO THE Y COORDINATE AS FIXX DID TO  
00950 ; TO THE X COORDINATE.

4A9D 3A114C 00960 FIXY LD A,(YCOOR)

4AA0 21134C 00970 LD HL,YINC

4AA3 96 00980 SUB (HL)

4AA4 32114C 00990 LD (YCOOR),A

4AA7 3A134C 01000 LD A,(YINC)

4AAA ED44 01010 NEG

4AAC 32134C 01020 LD (YINC),A

4AAF C3614A 01030 JP CONT

01040 ; KBOARD SCANS THE KEYBOARD FOR THE UP ARROW AND DOWN  
01050 ; ARROW KEYS.

4AB2 3A4038 01060 KBOARD LD A,(3840H) ;LOCATION OF ARROW KEYS

4AB5 B7 01070 OR A ;KEY PRESSED?

4AB6 C8 01080 RET Z ;NO...RETURN

4AB7 FE08 01090 CP 8 ;UP ARROW?

4AB9 CAC24A 01100 JP Z,MOVUP ;YES...MOVE BAT UP.

4ABC FE10 01110 CP 16 ;DOWN ARROW?

4ABE CAE34A 01120 JP Z,MOVED ;YES...MOVE BAT DOWN.

4AC1 C9 01130 RET

01140 ; MOUUP MOVES THE BAT UP THE SCREEN

4AC2 3E20 01150 MOUUP LD A,20H ;ASCII FOR SPACE.

4AC4 2A144C 01160 LD HL,(BATLOC) ;GET BAT LOCATION.

4AC7 77 01170 LD (HL),A ;ERASE OLD BAT.

4AC8 114000 01180 LD DE,64 ;DECREMENT VALUE

4ACB B7 01190 OR A ;CLEAR CARRY

4ACC ED52 01200 SBC HL,DE ;SUBTRACT 64 FROM BAT LOCATION

4ACE 11003C 01210 LD DE,3C00H ;START OF SCREEN

4AD1 CD390A 01220 CALL 0A39H ;CP HL&DE  
01230 ; THE FLAGS.

4AD4 FCDE4A 01240 CALL M,TOOSML ;S FLAG SET IF HL<DE

4AD7 22144C 01250 LD (BATLOC),HL ;SAVE NEW BAT LOCATION

4ADA 3EAA 01260 LD A,0AAH ;BAT CHARACTER IN ASCII

4ADC 77 01270 LD (HL),A ;TO DISPLAY

4ADD C9 01280 RET

01290 ; THIS SUBROUTINE IS CALLED IF HL IS SMALLER THAN 3C00H

4ADE 114000 01300 TOOSML LD DE,64 ;INCREMENT VALUE

4AE1 19 01310 ADD HL,DE ;ADD TO WRONG BAT LOCATION

4AE2 C9 01320 RET

01330 ; MOUDN MOVES THE BAT DOWN THE SCREEN

4AE3 3E20 01340 MOUDN LD A,20H ;ASCII BLANK

4AE5 2A144C 01350 LD HL,(BATLOC) ;OLD BAT LOCATION

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4AE8 77      01360    LD      (HL),A ;ERASE OLD BAT
4AE9 114000   01370    LD      DE,64 ;INCREMENT VALUE
4AEC 19       01390    ADD    HL,DE ;ADD DE TO HL
4AED 11FF3F   01390    LD      DE,3FFFH ;END OF VIDEO SCREEN
4AF0 CD390A   01400    CALL    0A39H ;COMPARE HL AND DE
4AF3 F4FD4A   01410    CALL    P,TOOBIG ;S FLAG RESET IF HL<DE
4AF6 22144C   01420    LD      (BATLOC),HL ;SAVE NEW BAT LOCATION
4AF9 3EAA     01430    LD      A,0AAH ;BAT VALUE IN ASCII
4AFB 77       01440    LD      (HL),A ;DISPLAY IT.
4AFC C9       01450    RET
01460 ; THIS SUBROUTINE IS CALLED IF HL IS LARGER THAN 3FFFH
4AFD B7       01470    TOOBIG OR A ;CLEAR CARRY
4AFE 114000   01480    LD      DE,64 ;DECREMENT VALUE
4B01 ED52     01490    SBC    HL,DE ;SUBTRACT DE FROM HL
4B03 C9       01500    RET
01510 ; TEST SEES IF THE BALL HAS HIT THE BAT AND INCREMENTS
01520 ; THE HIT SCORE AND BOUNCES THE BALL ACCORDINGLY.
4B04 3EAA     01521    TEST   LD      A,0AAH ;REDRAW BAT
4B06 2A144C   01522    LD      HL,(BATLOC)
4B09 77       01523    LD      (HL),A
4B0A CD674A   01530    CALL    POINT  ;IS BALL LOCATION SET?
4B0D CD052B   01540    CALL    2B05H ;LOAD RESULT OF TEST INTO DE
4B10 7B       01550    LD      A,E ;LOAD RESULT INTO A
4B11 FE00     01560    CP     0 ;SET?
4B13 C8       01570    RET    Z ;NO...RETURN
4B14 CD6F4B   01580    CALL    INCHIT ;YES...INCREMENT HIT VALUE
4B17 CD8A4A   01590    CALL    FIXX  ;AND BOUNCE BALL OFF BAT
4B1A C9       01600    RET
01610 ; SERVE INCREMENTS THE MISS VALUE AND DOES A SHORT DELAY
01620 ; BEFORE SERVING ANOTHER BALL.
4B1B CD7E4B   01630    SERVE  CALL    INCMIS ;INCREMENT MISS VALUE
4B1E 010000   01640    LD      BC,0 ;SET DELAY VALUE
4B21 CD6000   01650    CALL    60H ;DO DELAY
4B24 C32A4A   01660    JP     INIT1 ;SERVE BALL
01670 ; RANDOM ESTABLISHES A RANDOM START LOCATION FOR NEW BALL
4B27 212F00   01680    RANDOM LD      HL,47 ;MAXIMUM Y VALUE
4B2A CD374B   01690    CALL    GETRND ;GET RANDOM NUMBER
4B2D 7B       01700    LD      A,E ;RANDOM NUMBER TO A
4B2E 32114C   01710    LD      (YCOOR),A ;PUT IT IN Y COORDINATE
4B31 3E00     01720    LD      A,0 ;FIRST X LOCATION
4B33 32104C   01730    LD      (XCOOR),A ;PUT IT IN X COORDINATE
4B36 C9       01740    RET
01750 ;GETRND GENERATES A RANDOM NUMBER BETWEEN 1 AND THE VALUE
01760 ; IN THE HL REGISTER PAIR. THE RESULT IS PLACED IN THE
01770 ; DE REGISTER PAIR.
4B37 CD9A0A   01780    GETRND CALL    0A9AH ;SAVE HL IN ACCUMULATOR
4B3A CDC914   01790    CALL    14C9H ;GENERATE RANDOM NUMBER
4B3D CD7F0A   01800    CALL    0A7FH ;CONVERT TO INTEGER
4B40 CD052B   01810    CALL    2B05H ;PUT ACCUMULATOR IN DE
4B43 C9       01820    RET
01830 ; BORDER DISPLAYS THE LINE DOWN THE CENTER OF THE SCREEN
4B44 21263C   01840    BORDER LD      HL,3C00H+38 ;START LOCATION ON LINE 0
4B47 0610     01850    LD      B,15 ;NUMBER OF LINES OF SCREEN
4B49 3E95     01860    LD      A,95H ;DISPLAY BYTE
4B4B 114000   01870    LD      DE,64 ;INCREMENT VALUE
4B4E 77       01880    LOOP1 LD      (HL),A ;DISPLAY BYTE
4B4F 19       01890    ADD    HL,DE ;ADD INCREMENT TO SCREEN LOCATION
4B50 10FC     01900    DJNZ   LOOP1 ;REPEAT 15 TIMES
4B52 C9       01910    RET
01920 ; MESGES DISPLAYS MESSAGES 1,2 AND 3 AT SET LOCATIONS
4B53 21184C   01930    MESGES LD      HL,MES1
4B56 116E3C   01940    LD      DE,15470
4B59 CDC54B   01950    CALL    DISP
4B5C 21244C   01960    LD      HL,MES2
4B5F 11EE3C   01970    LD      DE,15598
4B62 CDC54B   01980    CALL    DISP
4B65 212A4C   01990    LD      HL,MES3
4B68 116E3D   02000    LD      DE,15726
4B6B CDC54B   02010    CALL    DISP
4B6E C9       02020    RET
02030 ; INCHIT INCREMENTS THE NUMBER OF TIMES THAT THE BALL
02040 ; WAS HIT AND DISPLAYS IT.
4B6F 3A164C   02050    INCHIT LD      A,(HIT) ;GET OLD HIT VALUE
4B72 3C       02060    INC    A ;INCREMENT

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4B73 27    02070      DAA          ;ADJUST FOR BCD
4B74 32164C 02080      LD   (HIT),A    ;STORE NEW HIT VALUE
4B77 21F33C 02090      LD   HL,15503   ;LOCATION TO DISPLAY AT
4B7A CD954B 02100      CALL  DISSCR    ;DISPLAY HIT VALUE
4B7D C9     02110      RET

02120 ; INCMIS INCREMENTS THE NUMBER OF TIMES THAT THE BALL
02130 ; WAS MISSED AND DISPLAYS IT.

4B7E 3A174C 02140      INCMS LD   A,(MISS)  ;GET OLD MISS VALUE
4B81 3C     02150      INC   A          ;INCREMENT IT
4B82 27     02160      DAA          ;ADJUST FOR BCD
4B83 32174C 02170      LD   (MISS),A  ;SAVE NEW SCORE
4B86 21753D 02180      LD   HL,15733   ;LOCATION TO DISPLAY AT
4B89 CD954B 02190      CALL  DISSCR    ;DISPLAY SCORE
4B8C 3A174C 02200      LD   A,(MISS)
4B8F FE25    02210      CP   2SH        ;NO. OF BALLS
4B91 CACD4B 02220      JP   Z,OVER
4B94 C9     02230      RET

02240 ; DISSCR DISPLAYS THE VALUE IN THE REGISTER A AT THE
02250 ; LOCATION CONTAINED IN THE HL REGISTER PAIR.

4B95 CD9E4B 02260      DISSCR CALL  CONV  ;CONVERT TO 2 DIGITS IN BC PAIR
4B98 78     02270      LD   A,B        ;DIGIT 1 TO A
4B99 77     02280      LD   (HL),A    ;DISPLAY IT
4B9A 79     02290      LD   A,C        ;DIGIT 2 TO A
4B9B 23     02300      INC   HL        ;NEXT LOCATION
4B9C 77     02310      LD   (HL),A    ;DISPLAY IT
4B9D C9     02320      RET

02330 ; CONV CONVERTS THE VALUE IN THE A REGISTER TO TWO
02340 ; ASCII DIGITS IN THE BC REGISTER PAIR.

4B9E 47     02350      CONV LD   B,A        ;SAVE A
4B9F E60F    02360      AND  0FH        ;MASK OUT BITS 4-7
4BA1 CDB54B 02370      CALL  CONV2  ;CONVERT A TO ASCII
4BA4 4F     02380      LD   C,A        ;PUT RESULT IN C REGISTER
4BA5 78     02390      LD   A,B        ;RETRIEVE A
4BA6 E6F0    02400      AND  0FOH       ;MASK OUT BITS 0-3
4BA8 CB3F    02410      SRL  A          ;BRING BITS 4-7 INTO BITS 0-3
4BA9 CB3F    02420      SRL  A
4BAC CB3F    02430      SRL  A
4BAE CB3F    02440      SRL  A
4BB0 CDB54B 02450      CALL  CONV2  ;CONVERT A TO ASCII
4BB3 47     02460      LD   B,A        ;SAVE TO B
4BB4 C9     02470      RET

02480 ; CONV2 CONVERTS THE A REGISTER TO ITS ASCII EQUIVALENT
4BB5 FE0A    02490      CONV2 CP   0AH        ;IS CHARACTER >=A
4BB7 DABC4B 02500      JP   C,CONV3   ;NO..JUMP TO CONV3
4BBA C607    02510      ADD  A,7        ;ADJUST FOR ALPHABETIC CHARACTERS
4BBC C630    02520      CONV3 ADD  A,30H       ;CONVERT TO ASCII
4BBE C9     02530      RET
4BBF CD8A4A    02540      FIXX1 CALL  FIXX
4BC2 C34D4A    02550      JP   INCY
02560 ; DISP DISPLAY MESSAGE POINTED BY HL AT DE
4BC5 EDS32040 02570      DISP LD   (4020H),DE
4BC9 CDA728    02580      CALL  28A7H
4BCC C9     02590      RET
02595 ; OVER DISPLAYS MESSAGES 4-8 AND AWAITS INPUT
4BCD E1     02596      OVER POP  HL
4BCE 21324C 02600      LD   HL,MES4
4BD1 11EE3D 02610      LD   DE,15854
4BD4 CDC54B 02620      CALL  DISP
4BD7 21444C 02630      LD   HL,MESS
4BDA 11AE3E 02640      LD   DE,16046
4BDD CDC54B 02650      CALL  DISP
4BE0 21554C 02660      LD   HL,MES6
4BE3 11EE3E 02670      LD   DE,16110
4BE6 CDCS4B 02680      CALL  DISP
4BE9 21604C 02690      LD   HL,MES7
4BEC 116E3F 02700      LD   DE,16238
4BEF CDC54B 02710      CALL  DISP
4BF2 21714C 02720      LD   HL,MES8
4BF5 11AE3F 02730      LD   DE,16302
4BF8 CDC54B 02740      CALL  DISP
4BFB 3A4038 02750      INPT LD   A,(14400)
4BFE B7     02760      OR   A
4BFF 28FA    02770      JR   Z,INPT
4C01 FE01    02780      CP   1

```

```

4C03 CA004A 02790      JP      Z, INIT
4C06 FE04 02800      CP      4
4C08 20F1 02810      JR      NZ, INPT
4C0A CDC901 02820      CALL    1C9H
4C0D C3CC06 02830      JP      6CCH
4C10 00 02840 XCOORD   DEFB    0      ;X COORDINATE
4C11 00 02850 YCOORD   DEFB    0      ;Y COORDINATE
4C12 01 02860 XINC    DEFB    1      ;X INCREMENT VALUE
4C13 01 02870 YINC    DEFB    1      ;Y INCREMENT VALUE
4C14 0000 02880 BATLOC  DEFW    0      ;BAT LOCATION
4C16 00 02890 HIT     DEFB    0      ;HIT SCORE INITIAL VALUE
4C17 00 02900 MISS    DEFB    0      ;MISS SCORE INITIAL VALUE
4C18 54 02910 MES1    DEFM    'T E N N I S' ;1 SPACE BETWEEN LETTERS
4C23 00 02920          DEFB    0
4C24 48 02930 MES2    DEFM    'HITS:'
4C29 00 02940          DEFB    0
4C2A 4D 02950 MES3    DEFM    'MISSES:'
4C31 00 02960          DEFB    0
4C32 2A 02970 MES4    DEFM    '*** GAME OVER ***'
4C43 00 02980          DEFB    0
4C44 50 02990 MESS    DEFM    'PRESS <ENTER> TO'
4C54 00 03000          DEFB    0
4C55 50 03010 MES6    DEFM    'PLAY AGAIN'
4C5F 00 03020          DEFB    0
4C60 50 03030 MES7    DEFM    'PRESS <BREAK> TO'
4C70 00 03040          DEFB    0
4C71 54 03050 MES8    DEFM    'TERMINATE'
4C7A 00 03060          DEFB    0
4A00           03070          END     INIT
00000 TOTAL ERRORS

```

BATLOC	4C14	02880	00230	01160	01250	01350	01420	01522
BORDER	4B44	01840	00250					
CONT	4A61	00610	01030					
CONV	4B9E	02350	02260					
CONV2	4BB5	02490	02370	02450				
CONV3	4BBC	02520	02500					
DELAY	4A83	00790	00350					
DISP	4BC5	02570	01950	01980	02010	02620	02650	02680
			02740					
DISSCR	4B95	02260	02100	02190				
FIXX	4A8A	00850	01590	02540				
FIXX1	4BBF	02540	00480					
FIXY	4A9D	00960	00570	00590				
GETRND	4B37	01780	01690					
GRAFIX	4A73	00700	00660	00680				
HIT	4C16	02890	00200	02050	02080			
INCHIT	4B6F	02050	01580					
INCMIS	4B7E	02140	01630					
INCX	4A39	00400						
INCY	4A4D	00510	02550					
INIT	4A00	00150	02790	03070				
INIT1	4A2A	00320	01660					
INITRM	4A1F	00280						
INPT	4BFB	02750	02770	02810				
KBOARD	4AB2	01060	00360					
LOOP	4A2D	00340	00620					
LOOP1	4B4E	01880	01900					
MES1	4C18	02910	01930					
MES2	4C24	02930	01960					
MES3	4C2A	02950	01990					
MES4	4C32	02970	02600					
MES5	4C44	02990	02630					
MES6	4C55	03010	02660					
MES7	4C60	03030	02690					
MES8	4C71	03050	02720					
MESGES	4B53	01930	00160					
MISS	4C17	02900	00210	02140	02170	02200		
MOVED	4AE3	01340	01120					
MOVEUP	4AC2	01150	01100					
OVER	4BCD	02596	02220					
POINT	4A67	00650	01530					
RANDOM	4B27	01680	00320					
RESET	4A71	00690	00370					
SAUX	4A4A	00490						
SAVY	4A5E	00500						
SERVE	4B1B	01630	00460					
SET	4AGC	00670	00340					
TEST	4B04	01521	00610					
TESTX	4A40	00450						
TESTY	4A54	00560						
TOOBIG	4AFD	01470	01410					
TOOSML	4ADE	01300	01240					
XCOORD	4C10	02840	00180	00410	00490	00710	00850	00890
XINC	4C12	02850				00920		
YCOORD	4C11	02850				00520	00600	00730
YINC	4C13	02870				00510	00970	01000

## \*\*\*\*\* NEXT MONTH'S ISSUE\*\*\*\*\*

Next months issue will contain at least the following programs plus the usual features, articles, news, letters, etc..

**\*\* KEYNOTE (L1/4K) \*\***

An educational game in which the computer draws musical notes on the screen and you have to identify them. A great help for someone just learning music.

**\*\* TBUG2 (L2.m1) \*\***

A nice modification to the TANDY TBUG program that gives a full screen width dump of memory to the M command and has a user controlled stop/start scrolling action as well. Don't be misled, we are not publishing the TBUG program itself, just the modifications.

**\*\* MICROHEX (L2/4K) \*\***

Converts a Decimal number to Hex, Hex to Decimal, lets the user input the Decimal address to be jumped to in a USR call and decodes it down into the values to be poked as MSB and LSB and lets the user input Memory usage and tells him what to poke into the variable pointers when chaining programs. It's all done in under 2K of basic so that you can see how it's done as well.

**\*\* PINBALL MACHINE (L1/4K) \*\***

This is one pinball machine that you can't tilt! If only you could find a way to charge 20c for 5 shots, this program would make your fortune.

**\*\* MURDER (L2/16K) \*\***

Detective type game in which you have to puzzle out who killed who with what, when and where. But there is one small catch, (pun intended) when you catch him/her, they are liable to fight back. Complete with graphic floor plans of each floor showing you and the other occupants.

**\*\* ASTRONOMY (L2/16K) \*\***

If you are interested in Astronomy you will find this program very useful. Here are just some of its features...Time conversions, co-ordinate conversions, precession, solar calculations, solar elongations, planetary calculations, lunar calculations..etc

)-80 \*\*\*  
appropriate.

with your name  
System 1 or 2,  
name and address  
the accompanying

what the program

close stamps or

## \*\*\*\*\* CASSETTE EDITION INDEX \*\*\*\*\*

The cassette edition of MICRO-80 contains all the software listed each month, on cassette. All cassette subscribers need do is CLOAD and RUN the programs. Level II programs are recorded on Side 1 of the cassette and Level I programs on Side 2. All programs are recorded twice in succession. The rates for a cassette subscription are printed on the inside front cover of each issue of the magazine.

		I.D.	APPROX.	START	POSITION
			CTR-41	CTR-80	SYS 80
<u>SIDE 1</u>					
C WORD	L2/4K	W	10 32	7 22	5 15
CHESS BOARD	L2/16K	S	53 103	36 70	25 50
CELLAR CONTROL	L2/16K	C	150 180	102 122	70 85
LIFE (m1.)	SYSTEM MEM SIZE = 30314	LIFE	205 215	140 146	100 103
LIFE (BASIC)	L2/16K	L	227 240	154 162	108 113
LIFE (Source)	EDTASM	LIFE	250 280	170 192	120 135
TENNIS (m1.)	L2/4K SYSTEM	TENNIS	310 320	212 218	148 153
TENNIS (Source)	EDTASM	TENNIS	330	223	156
<u>SIDE 2</u>					
SHOOTING GALLERY	L1/4K	-	45 103	30 70	-
MATURITY TEST	L1/4k	-	160 215	108 145	-

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# **MICRO-80**

## **LEVEL II ROM REFERENCE MANUAL**

by Edwin Paay

Published by MICRO-80 PRODUCTS

Written by Eddy Paay, the LEVEL II ROM REFERENCE MANUAL is the most complete explanation of the Level II BASIC interpreter ever published.

Part 1 lists all the useful and usable ROM routines, describes their functions explains how to use them in your own machine language programs and notes the effect of each on the various Z 80 registers.

Part 1 also details the contents of system RAM and shows you how to intercept BASIC routines as they pass through system RAM. With this knowledge, you can add your own commands to BASIC, for instance; or position BASIC programs in high memory—the only restriction is your own imagination!

Part 2 gives detailed explanations of the processes used for arithmetical calculations, logical operations, data movements, etc. It also describes the various formats used for BASIC, SYSTEM and EDITOR/ASSEMBLER tapes. Each section is illustrated by sample programs which show you how you can use the ROM routines to speed up your machine language programs and reduce the amount of code you need to write.

The LEVEL II ROM REFERENCE MANUAL is intended to be used by machine language programmers. It assumes a basic understanding of the Z 80 instruction set and some experience of Assembly Language programming. But BASIC programmers too will benefit from reading it. They will gain a much better insight into the functioning of the interpreter which should help them to write faster, more concise BASIC programs.

# **MICRO-80**